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## Architecture for Scalable, Self-human-centric, Intelligent, Secure, and Tactile next generation IoT



# D2.8 – Advisory Board Minutes – First Meeting

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# Executive Summary

This Ethics Requirements report is written in the framework of WP2 of the H2020-funded project ASSIST-IoT (Grant No. 958257).

The purpose of arranging a board of advisory members lies on gathering relevant knowledge to implement technological improvements in ASSIST-IoT project (either the technological and the pilots-stakeholders part) and to generate key ideas for future exploitation and development of innovative business plans for the outcome products of ASSIST-IoT.

This document summarises the process carried out to select Advisory Board members of ASSIST-IoT, which is composed by seven experts coming from the fields of: (i) Standardisation and pre-normative entities, (ii) Edge to Cloud Computing Continuum, (iii) Artificial Intelligence at the edge, (iv) 5G and associated technologies applicable to IoT, (v) Stakeholder representative with experience in innovative digital projects (i.e., validation of disruptive business models) and (vi) Next Generation IoT.

In addition, the plan for the schedule of the coming meetings has also been devised. It comprises two physical meetings (COVID-19 restrictions depending) and a minimum of four additional virtual meetings, arranged close to key milestones of the project for maximising mutual benefit on the interchange.

The fruits of the first round of individual meetings (one per each member) are also gathered in this document. Those are already being incorporated in ASSIST-IoT workplan in the form of recommendations focused on (i) project management, (ii) technical orientation, (iii) exploitation and (iv) standardisation.

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## List of acronyms

Acronym	Explanation
<b>AB</b>	Advisory Board
<b>ABECI</b>	Advisory Board Expected Contributions Indicators
<b>AI</b>	Artificial Intelligence
<b>CSA</b>	Coordination and Support Action
<b>CTO</b>	Chief Technology Officer
<b>Dx.y</b>	Deliverable No. x of Work Package y
<b>FPGA</b>	Field Programmable Gate Array
<b>HPC</b>	High Performance Computing
<b>IoB</b>	Internet of Bodies
<b>IoT</b>	Internet of Things
<b>KPI</b>	Key Performance Indicator
<b>MEC</b>	Mobile Edge Computing
<b>NDA</b>	Non-Disclosure Agreement
<b>NFV</b>	Network Function Virtualization
<b>NGIoT</b>	Next Generation IoT
<b>P2P</b>	Peer-to-Peer
<b>SD-WAN</b>	Software Defined Wide Area Network
<b>SDN</b>	Software Defined Network
<b>WP</b>	Work Package

# 1. About this document

This document is the first of a series of three deliverables associated to the interaction of ASSIST-IoT Consortium with the selected Advisory Members. This first version serves also to define the roadmap and plan of activities for task T2.5. All three of them will constitute the execution report of such task, gathering the feedback obtained from the members and the recommendations and influence of those in the workplan of the project.

## 1.1. Deliverable context

*Table 1. Deliverable context*

Keywords	Lead Editor
<b>Objectives</b>	<p>Directly linked with Objective O8, specifically towards achieving KVIs of the communities joined and professional attracted, together with innovative business models delivered.</p> <p>Although not directly related with other objectives, the recommendations provided by AB members are expected to enhance the overall quality of ASSIST-IoT research.</p>
<b>Exploitable results</b>	N/A. Although not directly generating any KER, the recommendations provided by AB members are expected to enhance the quality and impact of those.
<b>Work plan</b>	<p>This deliverable is directly linked to task T2.5 – Advisory Board Management, serving both as guidelines/plan and as execution report.</p> <p>Indirectly, this deliverable is linked with tasks T2.1, T2.2, T9.2, T9.3 and T9.4, as the interaction/contribution with/from AB members is expected to have considerable influence in the global management of the project and its associated dissemination impacts.</p>
<b>Milestones</b>	N/A
<b>Deliverables</b>	This deliverable constitutes of a series of three deliverables aiming at describing feedback from AB. D2.8 will directly feed D2.9 and D2.10.
<b>Risks</b>	<p>Risk#2.5 – Advisory Board members are not able to conduct satisfactorily the required assessment and/or advisory roles.</p> <p>This deliverable describes the actions and results from the interaction with AB members, which should contribute to minimise that risk.</p>

## 1.2. The rationale behind the structure

The content of the deliverable is organized in six main sections:

- **Section 2** describes the selection of the members that are part of ASSIST-IoT's Advisory Board, the procedure conducted and how their contribution to the project formalises. It also reflects the contributions expected by the AB towards the benefit of the project.
- **Section 3** depicts the plan of meetings with the Advisory Board along the project duration.
- **Section 4** [Error! No se encuentra el origen de la referencia].
- **Section 5** lists the next action points to be addressed by ASSIST-IoT partners on this regard.
- Finally, **Section 6** concludes the document reflecting on the results obtained so far.
- On a separate not, Appendix A includes the CV of every AB member.

## 2. Advisory Board Members

### 2.1. Description

The purpose of arranging a board of advisory members lies on gathering relevant knowledge to implement technological improvements in ASSIST-IoT project (either the technological and the pilots-stakeholders part) and to generate key ideas for future exploitation and development of innovative business plans for the outcome products of ASSIST-IoT.

Selected members of this board will meet regularly with the Consortium throughout the project. At the same time, the Consortium will allow the members to keep track of global advance of the project and to be aware of scientific and industrial discoveries to be reached.

According to the plan, The Advisory Board (AB) consists of external experts (at least, 4 key members from Industry and academia) that will advise strategically the Consortium. The composition of the AB must be heterogeneous, including expertise from different sectors, not specifically related to technological research objective.

During the first 6 months of the project the activity has been intensive with regards to the Advisory Board composition and management.

First of all, both the Coordination of the project and Technical Coordination, altogether with opinion of every partner decided which profiles should be addressed for selecting ASSIST-IoT's Advisory Board members. This was a matter of discussion during the Kick-Off meeting of the project. A specific sub-slot in the agenda was devoted to this topic. The agreements arrived during that meeting were reflected on its minutes.

In this sense, the conclusion was to search for **a total of 7 members** for the AB covering the following realms:

1. Standardisation and pre-normative entities
2. Edge to Cloud Computing Continuum
3. Artificial Intelligence at the edge
4. 5G and associated technologies applicable to IoT: such as SDN, NFVs, SD-WAN or others.
5. Stakeholder representative with experience in innovative digital projects
6. Next Generation IoT

Then, all partners were requested to come up with propositions people/corporation that could fit those profiles. After several rounds of calls and first contacts, a total number of 12 people were pre-chosen.

Afterwards, this point was repeatedly discussed during various plenary teleconferences of the project (conducted bi-weekly). There, with all partners present, several names arose as the most suitable for being part of the AB and, after deliberation, it was decided to finally conform the board with a sub-set of 7 members.

In Table 2 it is shown the list of selected people to be part of ASSIST-IoT's Advisory Board and their field of expertise:

*Table 2. ASSIST-IoT Advisory Board members*

Title	Name	Organisation - Position	Field of expertise
<b>Mr.</b>	Konstantinos Karachalios	IEEE SA, Managing Director	Standardisation and pre-normative
<b>Prof.</b>	Joydeep Mitra	Michigan State University	Smart grid reliability and dependability
<b>Dr.</b>	Pawel Gepner	Graphcore AI, System Arch.	AI at cloud and edge, smart devices
<b>Prof.</b>	Ivana Podnar	University of Zagreb	Next Generation IoT
<b>Prof.</b>	Jari Collin	TELIA Finland, CTO	Cloud computing and IoT, 5G
<b>Mr.</b>	José García de la Guía	TIBA Logistics,	Digital Transformation in port sector
<b>Dr.</b>	Harilaos Koumaras	NCSR Demokritos,	5G

Managerially, the participation of all Advisory Board members has been framed as follows:

- Initially, **three** physical AB meetings are planned during the project. Needless to say, these meetings will only take place whenever travelling among countries will be safe, depending on COVID-19-associated restrictions. If AB meetings must be conducted in a moment where this safety cannot be guaranteed, the modality will be shifted to virtual. At this point (for the first, preliminary contact meeting) everything is being conducted virtually in ASSIST-IoT.
- There has been established the need of formalising their participation via the provision of a series of documents:
  - **Signature of a Non-Disclosure Agreement (NDA):** All AB members have been requested to sign an NDA (on an individual figure or on behalf of their company, varyingly) with the Project Coordinator (on behalf of ASSIST-IoT Consortium)- find the template attached in Appendix B - in order to guarantee a proper exchange of information. The NDA template that has been used has been validated by the Project Coordination and is compliant with the terms set out in the Consortium Agreement of the action.
  - Proper provision of Ethics documentation. Deliverables D1.1 and D1.2 are being released at the same time than D2.8. According to those pieces, Advisory Board members are considered Humans participating in the project. Additionally, certain personal data of AB members (e.g., name, position, email, etc.). Therefore, the **Participant Information Sheet** about project facts and data processing details was forwarded to all AB members. Consequently, an **Informed Consent was also requested to be signed** by every AB member.
- The results of the meetings with Advisory Board members will be formally reported via specific deliverables of the workplan. This very document (D2.8) will be the first of a series of three (D2.9 and D2.10) deliverables that will cover this purpose.
- Travel expenses associated to attendance of these meetings will be covered by the Project Coordinator (as it is indicated in the Grant Agreement).

## 2.2. Expected contributions

According to the Grant Agreement, *the AB will be responsible for providing feedback on action outputs, and recommendations related to alignment with evolving SotA of concepts and technologies pertinent to action activities.*

In practical terms, the AB members (listed above in 2.1) are expected to provide:

- Technical, ethical and legal guidance from an external point of view. Some considerations might be underweighted by the Consortium on any of the previous aspects. Having external perspectives might help a better addressment of those.
- Detection of potential risks. Similar to the previous points, some risks might be detected by AB members and forwarded to ASSIST-IoT to act upon. Although ASSIST-IoT Consortium counts with well experienced partners in terms of management and technical direction, it is very likely that specific risks (e.g., reiterated problems by stakeholders of adapting their networks to IoT requirements) might come from external observation of the project.
- Input and feedback on the ASSIST-IoT industrial and technological roadmap.
- Advise on links with relevant interest groups outside ASSIST-IoT and encourage interactions with other projects and initiatives. Usually, the AB members will be involved in specific groups/activities seeking for similar objectives to ASSIST-IoT. Being kept posted of the advances of such groups will enrich ASSIST-IoT peripheral vision.
- Facilitate information about trends on disruptive business models in their respective fields of expertise.
- To better position ASSIST-IoT towards specific actions. ASSIST-IoT Consortium has decided to include key members in its Advisory Board that are well positioned at relevant fora for the project (e.g., a managing director of a unit of IEEE standardisation association).

- To bring ASSIST-IoT to dissemination events. Either separately or in a joint fashion, it is planned to involve AB members to maximise outreach of ASSIST-IoT results in international events.
- Apart from the previous, the main format of collaboration among AB members and the ASSIST-IoT Consortium will be by attending to meetings or workshops and interaction through e-mails.
- Help shaping Open Call suggestions/definitions to align ASSIST-IoT brochure to current market needs.

In order to express the ASSIST-IoT Consortium intention and will of having these particular people in the board, here below is listed the particular expected value (in terms of ASSIST-IoT contribution) from each member:

- **Mr. Konstantinos Karachalias:** Being a relevant member of IEEE SA, the interaction with Mr. Karachalias will be primary focused on the potential contribution of ASSIST-IoT to the creation of standard or pre-normative documents. ASSIST-IoT will funnel the discussions with this member to maximise its impact in such kind of actions, as well as preparing enough documentation that could be easily shifted into official recommendations by IEEE SA.
- **Prof. Joydeep Mitra:** The applications of NGIoT are wide in terms of domain area and scope. A relevant field that is increasingly adopting such solutions is the Energy balance and Smart Grid domain. Prof. Mitra holds a highlighted position in a major U.S.A. higher education institution as specialist in Smart Grid and Energy distribution matters. Prof. Mitra will primarily contribute to ASSIST-IoT from the perspective of a potential adopter. Additionally, he is in well connection with U.S.A. policy makers in the area of public/private Energy and engineering, with considerable experience also in standardisation procedures in IEEE. Henceforth, he will also bring the policy making and standardisation perspective.
- **Dr. Pawel Gepner** is fully focused in one of the areas for ASSIST-IoT: smart devices applying Artificial Intelligence. With former experience as Engineer at INTEL Europe, Dr. Gepner is now in charge (technologically) of Graphcore AI, whose mission is to provide accelerated AI to a variety of devices (microcontrollers, FPGAs, etc.). This clearly fits ASSIST-IoT and the plan is to discuss with him the alignment of the tasks related to the Device and Edge plane and Federated Machine Learning.
- **Prof. Ivana Podnar** is currently coordinating a national, Croatia-funded project (IoT4us<sup>1</sup>) with very similar objectives that ASSIST-IoT. In addition, this member has wide experience in IoT-related EC-funded research projects (e.g., SymbIoTe) and deep knowledge of Big Data and cloud computing technologies. ASSIST-IoT plans to closely track the advances of IoT4us and to devise liaison activities. Mutual feedback is also expected.
- **Prof. Jari Collin:** As member of the telecom operator TELIA and Professor of the University of Aalto, the role of Prof. Collin within ASSIST-IoT's AB will be to support the 5G introduction as a structural part of the design of the architecture. With huge both academic and on-the-field expertise on the field of 5G (several pilots conducted in Finland by TELIA), the objective is to align ASSIST-IoT with the most solid, established, IoT-oriented edge-to-cloud computing continuum as well as with 5G techniques. It is considered especially suitable as NGIoT is one of the most important interests of him in terms of research potential.
- **Mr. José García de la Guía** is a well experienced professional that has spent many years in relevant positions of maritime ports management (e.g., the Port of Valencia) being in charge of innovative projects of digital transformation. He has wide expertise as well on EC-funded research and innovation projects, in which he has intervened both as participant and as Advisory Board member (e.g., PIXEL). Mr. García de la Guía will participate in ASSIST-IoT as a relevant potential adopter, being of special help to identify risk, barriers from the Industry and pitfalls over future realistic deployments.
- **Dr. Harilaos Koumaras:** Member of the National Centre for Scientific Research Demokritos in Greece is currently coordinating one of the most prominent H2020-funded projects in the field of 5G (5GENESIS). He holds outstanding experience on research projects focused on pilots using innovative technologies, which is an absolute fit to ASSIST-IoT. His contribution is expected to be channeled

<sup>1</sup> <https://iot4us.fer.hr/iot4us/en/contact>

towards the pilots' execution of ASSIST-IoT, while also providing relevant feedback about the introduction of SDN, NFV, heterogeneous access networks, IoT fit in the 5G, etc.

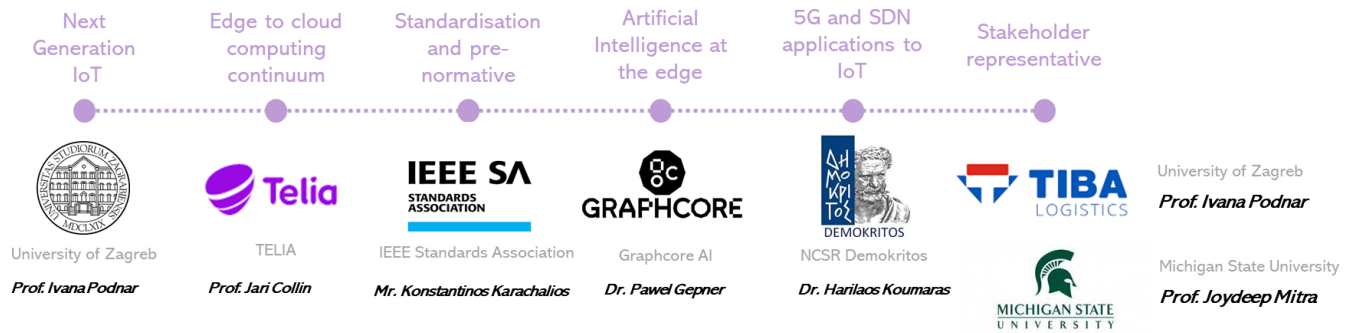


Figure 1. Areas covered by ASSIST-IoT Advisory Board members

Apart from the reflections above, the ASSIST-IoT managing team has created a set of specific KPIs to formalise the goals and expectations related to the Advisory Board participation in the project. The so-called Advisory Board Expected Contributions Indicators (ABECIs) will be used to track and monitor the influence (and level of support) that the project is receiving from its AB members. This is also conceived as a tool for improving the relation with the members, as it is intended to be a live asset that can be enhanced later during the project.

Table 3. Advisory Board Expected Contributions Indicator

Advisory Board Expected Contributions Indicator (ABECI)	Expected value
Risks identified from AB members and added to ASSIST-IoT risk mgmt. procedure.	4 risks
Pre-normative doc. of ASSIST-IoT outcome following standardisation template	1 doc.
Participation in standardisation working groups introduced by AB member	2 contributions
Recommendations of AB members becoming actions in ASSIST-IoT workplan	20 recommendations
Requirements (technological) coming from AB members included in ASSIST-IoT	4 requirements
Requirements (stakeholders') coming from AB members included in ASSIST-IoT	10 requirements
Liaison actions with external projects driven by AB-ASSIST-IoT interaction	4 actions
Attendance to events driven/guided/conducted by AB members	3 events

### 3. Meetings plan

As it was set out in the Grant Agreement, there will be **two formal physical AB meetings** during the action (if allowed by the global situation), with other additional two feedbacks to be requested in key moments of the action. Apart from those, it is planned that continuous mutual feedback will be conducted via scheduled teleconferences and P2P meetings.

Considering the previous, the initial planning (by M6 of the action) for AB meetings is the following:

- Virtual meetings: Teleconference calls will be properly scheduled to keep track of advances and to get feedback and other contribution from AB members. Planned dates for these meetings are:
  - Initial: first contact. Individually with each member.
  - General assembly with all Advisory Board members and several representatives of ASSIST-IoT Consortium
  - Globally, each 3/4 months, in order to keep a continuous feedback with enough time to steer direction of research/impact.

- Coinciding with key moments of the project: e.g., launch of Open Calls, before/after project review, before/after pilot demonstrations...
- Face-to-face meetings: ASSIST-IoT partners plan to have two physical meetings with the Advisory Board, coinciding with Plenary/Technical Meetings of the project. Planned dates for these meetings are:
  - ASSIST-IoT Technical Meeting – M16 – February 2022
  - ASSIST-IoT Plenary Meeting – M29 – March 2023

This plan will be updated at D2.9 and D2.10, adjusting to the timeline and advances of the project.

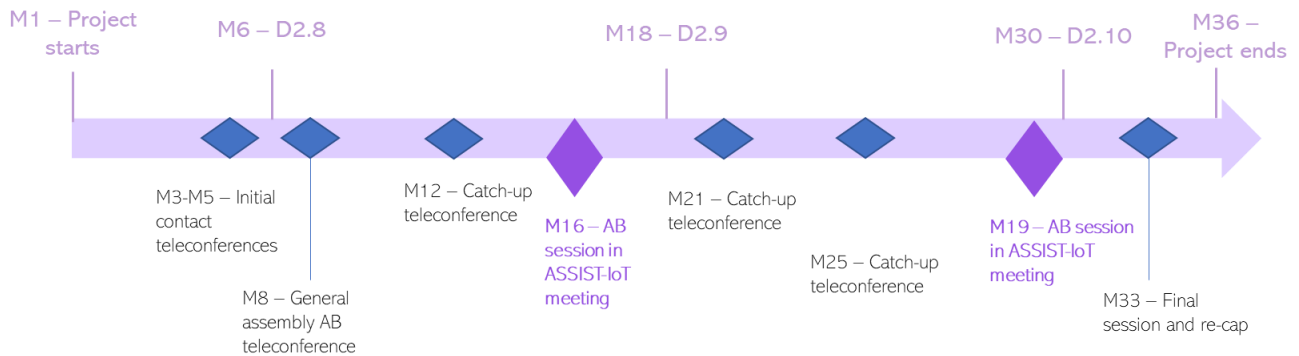


Figure 2. Advisory Board Meetings plan

## 4. First Advisory Board Meeting

Once the members were selected and confirmed by the two ends, the first meeting was planned.

The leader of the task proposed to the team to conduct the first meeting individually with each one of the Advisory Board members. This way, it would not be an assembly with all AB members gathered but a total of seven P2P teleconferences, each of one attended by one AB member at a time. The reason behind this proposal was two-fold: (i) First, for establishing a closer, more customised, less formal initial contact with every member. And (ii) second, to allocate enough time to boost ad-hoc discussions with each member oriented to their field of expertise. Arranging individual meetings allowed ASSIST-IoT team to prepare specific presentations, fine-tuned to the experience/expertise of each member to funnel the discussion for the sake of better feedback for the project.

Thus, **a total of seven meetings** were conducted during months M3 to M5.

The objectives (same for all of them) were the following:

- To present ASSIST-IoT project to the Advisory Board member.
- To gather initial feedback from the AB member about the project as a whole.
- To explain the expected role and contribution by the AB in the project.
- To contextualise the innovative proposal of ASSIST-IoT tailored to the field of expertise of each AB member.
- To inform about the current status of the project (SotA discovered, deliverables in preparation, dissemination actions conducted)
- To gather information about the potential relevance of ASSIST-IoT to the workfield of each AB member
- To explain next steps (with regards to signatures, formalisation of relation, etc.).
- To advance next meetings and outline the global plan of collaboration

## 4.1. Agenda

To ensure a fruitful meeting, ASSIST-IoT Consortium was represented, for each meeting, by several people, responding to key profiles. The list below showcases the structure of attendance on behalf of ASSIST-IoT Consortium:

- Project Coordination: At least 1 member (partner: UPV).
- Task T2.5 leader: At least 1 member (partner: UPV).
- Technical Coordination: At least member (partner: SRIPAS).
- Innovation Management: At least 1 member (partner: PRO).

All seven “first meetings” conducted during the period M3-M5 with the AB members had the same structure of the agenda, including intervention from various participants:

*Table 4. Agenda of first meetings*

Order	Lead speaker	Topic	Approx. duration
1	Project Coordination	Presentation of ASSIST-IoT in a nutshell	25 minutes
2	AB member	Presentation of background and expertise First feedback on the project	5 minutes 10 minutes
3	Technical Coordination	Status of the project, forthcoming technical outcomes	5-10 minutes
4	Innovation Manager	Innovative business models of ASSIST-IoT, global exploitation and innovation approach of the project	5 minutes
5	AB member	Recommendations, observations, other discussions	10-15 minutes
6	Task T2.5 Leaders	Next steps, contribution expected, managerial considerations	5 mins

## 4.2. Minutes of the Meeting

### 4.2.1. First meeting with Mr. Konstantinos Karachalios

- Project Coordinator explained the objective of AB collaboration, the need of this individual first contact and the intention to meet again (jointly with all AB members) in June 2021.
- Project Coordinator presented ASSIST-IoT using the official project presentation slides.
- The Project Coordinator emphasised the Open Calls as a good fit for collaboration from Mr. Karachalios about potential business plans and technical opportunities.
- The AB member made the following remarks about ASSIST-IoT:
  - The project is very interesting, using the smart approach of moving intelligence from cloud to the edge, which is mainly a good idea to solve latency problems.
  - The Consortium seems very complete and well rounded.
  - The Consortium structure is aligned with what IEEE tries to support: standardisation of technical ideas drawing from experts in the field that have experience on real use-cases, not only by theoretical means. because to the latency.
  - ASSIST-IoT has enough experts and capacity to greatly contribute to IEEE activities for standardisation of project’s ideas.
- Additionally, Mr. Karachalios made some reflections about which IEEE activities might be of interest for ASSIST-IoT.

- IEEE holds very interesting projects in related areas: tactile, also safety for smart manufacturing.
- The “Internet of the Bodies” (IoB) was mentioned, which is a “trending topic” area tightly related with NGIoT. This is the next level of what we have now (pcs, phones, etc.), and IEEE is in the quest for new protocols for the Internet of the Bodies. There is a huge need of having these protocols and rules, considering that classic approaches (IP-based networks) do not work anymore on this context.
- IEEE is also very active in edge-computing as, according to the AB member, the computing power must be replaced by the capacity of performing Artificial Intelligence. The paradigm will not anymore be put more capacity (in terms of cores, CPU, etc. at the edge), but in accelerating and optimising those towards AI execution at the edge.

- At that point, the Project Coordinator and Technical Coordinator intervened to contextualise ASSIST-IoT (expected and actual) contribution to IEEE and other standardisation initiatives:

- ASSIST-IoT was present in the kick-off meeting of Edge working group of IEEE. At this point there is one task in the project (T9.3) checking alignment of project’s topics with IEEE working groups.
- Drawing from the Internet of the Bodies initiative, ASSIST-IoT members concluded that with the advent of new interfaces (human-machine), there must be conceived (and worked overs) new interfaces, new ways of interacting one with another supported by IoT technologies.
- ASSIST-IoT members also adventured to envision one step beyond: the possibility of creating a data market after the IoB, IoT, etc. Security and privacy setting associated to these data is also primary.
- ORANGE Poland (partner in ASSIST-IoT Consortium) is Corporate Member of IEEE. ASSIST-IoT will interact with IEEE through ORANGE and potentially NEWAYS (another partner of the Consortium).

- Mr. Karachalios proceeded to clarify some aspects about how to collaborate with IEEE, explaining the options that would be open for ASSIST-IoT:

- If the collaboration is done by individuals, not need to have corporate member. IEEE is currently interacting with some good Chinese’ projects about topics related to ASSIST-IoT. Mr. Karachalios and his team may work for connecting those with ASSIST-IoT..
- For those meetings (with Chinese projects), it is possible for ASSIST-IoT to attend. Mr. Karachalios recommended ASSIST-IoT members to attend (no restriction there).
- Another relevant option: ASSIST-IoT could prepare a document about (e.g.,) architecture to become a specification for IEEE. Mr. Karachalios and his team would be willing to orient the Consortium in that direction for accelerating the creation of a standard out of ASSIST-IoT specifications. However, this action should be endorsed by a Consortium. ASSIST-IoT will study how to proceed for this and will strive for initiating the actions as soon as possible.
- After specific request by the Project Coordinator, the team of Mr. Karachalios explained how to potentially participate under Individual projects, without the need of being Corporate members. Four options were discussed:
  - a) Via corporate member entity
  - b) Via single individual projects
  - c) Via other events like Open meetings of working groups.
  - d) If ASSIST-IoT is able to create specifications within the Consortium following the template established by IEEE, those may become IEEE standards.

- Mr. Karachalios’ team was interested on the timing of the project. Project Coordinator clarified start date (November 2020) and end date (October 2023), indicating that plots will run from mid-2022, all three of them to be executed in parallel.

- Mr. Karachalios’ team was interested on the execution of the pilots. The Technical Coordinator proceeded to clarify ASSIST-IoT approach:

- The current status of the project is the in-depth definition of use cases, pilots, scenarios, etc. Additionally, the architecture (first version) is also in definition. After M6, the documents will be sent to the AB members, hoping to solve in detail any question related to those topics.
  - Technical coordinator expressed that a valuable input that is expected from IEEE's side is to become an extension of what is going on with regards to standardisation. Specially related with exploitation, to be able to answer to the following questions: *Is what we are doing worth to be included of standardisation? Is it aligned with the initiatives? Are there other requirements we are not taking into account?*
  - Mr. Karachalios agreed and kindly remark his team's availability for those matters. The key (at this point) is to encourage ASSIST-IoT to combine intelligence with research in the discussed fields, combining theoretical and practical results AND afterwards looking at IEEE for guide and direction towards standardisation.
- The meeting concluded by the Project Coordination team indicating next steps, documentation to be signed and other managerial considerations for moving forward.

#### 4.2.2. First meeting with Prof. Joydeep Mitra

- Project Coordinator explained the objective of AB collaboration, the need of this individual first contact and the intention to meet again (jointly with all AB members) in June 2021.
- Project Coordinator presented ASSIST-IoT using the official project presentation slides.
- The Technical Coordination team emphasised the objective of delivering a blueprint architecture (deliverable D3.5 ongoing) to become a reference for NGIoT deployments.
- The Innovation Manager introduced the huge challenges on impact (both research and market) that ASSIST-IoT is facing (and will face).
- The AB member made the following remarks (early feedback) about ASSIST-IoT:
  - The architecture seems quite fascinating, integrating the main elements and trends towards which the digital innovations are moving.
  - AB member indicated that his background (Smart Grid, smart energy. Reliability and resilience of infrastructures) differs a little from the scope of the project (IoT) but can clearly see how both worlds may fit together and potential applications.
  - It is important to find a balance between technological innovations, privacy of the data and security. ASSIST-IoT should carefully look towards harmonising all of the three. This looks quite like a challenge. According to the AB member, the dependability and reliability of the ASSIST-IoT architecture will depend to a large extent on how the management of this balance will be.
  - Drawing from the previous, the AB member put a clear example, taking advantage of one scenario of the port automation pilots: *think about privacy and concerns from a crane operator. Which kind of redundancy features can ASSIST-IoT support? QR boards? Cameras? How does lighting intensity affect to the cameras' image quality? And to the relevance of inference out of those images? Is there another way to retrieve such information? Is there another way to embed the data that may be transmitted via QR codes? Are there alternative tagging protocols?*
- Project Coordination and Technical Coordination teams exposed the extent to which the AB member is expected to contribute to ASSIST-IoT, realising the background and expertise informed:
  - Help from high level perspectives. Do you foresee any risk? What things would you recommend to be including aligned to your experience?
  - Potential help on identifying open call requests and potential contribution with ideas on that regards by Prof. Mitra.
  - Providing examples about resilient things to the Industry, Prof. Mitra's contributions from the user Industry point of view. Security, restrictions, QoS. Analysis of use-cases from the smart grid viewpoint.
  - Useful: potential information about Prof. Mitra's links with Policy Makers in the Energy sector in the U.S.A.

Technical Coordination team will share with the AB member technical documents. After M6, the documents will be sent to the AB members, hoping to solve in detail any question related to those topics.

The meeting concluded by the Project Coordination team indicating next steps, documentation to be signed and other managerial considerations for moving forward.

### 4.2.3. First meeting with Dr. Pawel Gepner

- Project Coordinator explained the objective of AB collaboration, the need of this individual first contact and the intention to meet again (jointly with all AB members) in June 2021.

- The AB member presented himself to put his background in perspective:

- 25 years working for INTEL (now in the start-up Graphcore as system architect).
- Background in High Performance Computing
- Master and PhD in HPC from TU Warsaw
- Focused on the backside of computing systems but with expertise in solutions interacting with the edge of the network.

- Project Coordinator presented ASSIST-IoT using the official project presentation slides.

- The Project Coordinator emphasised the Open Calls as a good fit for collaboration from Dr. Gepner about potential business plans and technical opportunities.

- The AB member made the following remarks (early feedback) about ASSIST-IoT:

- The words “Next Generation” in the context of IoT must mandatorily mean how the Machine Learning (ML) installation for the future will be.
- The AB member confirmed understanding of ASSIST-IoT approach, remarking that his contribution can be also focused on the potential role to be played by Big Data centres in NGIoT.
- Dr. Gepner reflected, in relation to ASSIST-IoT Smart Devices part, that mass production of innovative products is complex, difficult to scale and expensive. This should be considered whenever tackling exploitation of the results of the project in practical, industrial terms.
- Also, within Graphcore they have prominent knowledge on the Natural Language Processing techniques and technologies
- Dr. Gepner explained that within Graphcore there are experts in AI and ML algorithms. He will try to take advantage of that for supporting ASSIST-IoT. They have experience on doing it in a distributed environment. Same structured dataset. Not focused on communication patterns.

- Technical Coordination remarked that interoperability in the edge is key, reflecting about the last point commented by the AB member. In that context, TC asked the AB member about his experience on interoperability and semantic representation. Dr. Gepner answer that not huge in terms of semantics are put currently in place at their business, because it is mostly driven by use customer standard approach.

. The Project Coordinator exposed the rationale behind ASSIST-IoT approach, the reason why computing must be conceived from a bottom-up approach, starting by the device, then the far-edge, edge and, finally, cloud. The current stand of the project is analysing the technologies to bring such AI to the smallest unit of computing piece within that continuum (TinyML was mentioned).

- It was agreed that Dr. Gepner and the Technical Coordination team will be in continuous direct contact for understanding how to address the AI properly leveraging the expertise of the AB member.

The meeting concluded by the Project Coordination team indicating next steps, documentation to be signed and other managerial considerations for moving forward.

### 4.2.4. First meeting with Prof. Ivana Podnar Žarko

- Project Coordinator explained the objective of AB collaboration, the need of this individual first contact and the intention to meet again (jointly with all AB members) in June 2021.

- Project Coordinator presented ASSIST-IoT using the official project presentation slides.
- Project Coordinator emphasised about the relation with the CSA EU-IoT and the role of ASSIST-IoT with regards to liaising with other projects.
- Project Coordinator explained the inspiration from CreateIoT to devise ASSIST-IoT architecture.
- The AB member made the following remarks (early feedback) about ASSIST-IoT:
  - ASSIST-IoT proposes a very ambitious idea for the architecture, as well as very complete and ambitious scenarios for the pilots.
  - Prof. Podnar Žarko asked whether ASSIST-IoT plans to get rid completely of the cloud.
    - Project Coordinator explained that removing the cloud from the equation is not a requirement of ASSIST-IoT, considering that at the end of the day it is also a part of the “edge-to-cloud computing continuum”. The objective is (through ASSIST-IoT architecture) to allow shifting the computing from devices to the far-edge to the edge and then to the cloud, distributing the processing according to the needs, but primarily focusing on the edge.
  - Prof. Podnar Žarko asked whether ASSIST-IoT foresees any kind of migration of services within the edge.
    - Project Coordinator confirmed that hypothesis. For achieving that purpose, the idea is to federate the nodes and distribute the processing among them. A key element behind this approach is to introduce more powerful devices in the edge and assimilating them to the current power and tasks that are currently posed in the cloud. This will also be part of the federation's aim. Here is also where 5g's VNF functions and netApps come into play. The edge can call these inside the local network.
  - Prof. Podnar Žarko explained the project IoT4us (<https://iot4us.fer.hr/iot4us/en>, national project funded by Croatian Science Foundation), that she is coordinating and that has objectives similar to ASSIST-IoT in terms of edge computing and bringing AI to edge devices. Quite related to ASSIST-IoT goals. At the moment, the state of the art falls short on controlling edge devices from the cloud in real time.
    - According to the Technical Coordinator, ASSIST-IoT has envisioned a number of places where IoT4us project and ASSIST-IoT could be able to support each other and go hand to hand in some developing aspects and design a two-way collaboration of both teams, mutually bootstrapping deployments.
- Technical Coordinator exposed that the first set of relevant deliverables ASSIST-IoT: at the end of April. Fine-tuning the use-cases. Kindly request to Prof. Podnar Žarko to check the deliverables in early May.
- The Project Coordinator explained that the project will undergo a technical review in May.
- The Project Coordinator asked special contribution from Prof. Podnar Žarko with regards to dissemination events and potential joint effort in scientific dissemination as well (organisations from academia).

The meeting concluded by the Project Coordination team indicating next steps, documentation to be signed and other managerial considerations for moving forward. In particular, the Project Coordination ended by asking Prof. Podnar Žarko to go through the questionnaire that was created for D3.1 survey. Having the AB member answering such questionnaire would provide a more structured feedback about the project. To be done after the first round of contacts with the AB members.

#### 4.2.5. First meeting with Prof. Jari Collin

- Project Coordinator explained the objective of AB collaboration, the need of this individual first contact and the intention to meet again (jointly with all AB members) in June 2021.
- The AB member presented himself to put his background in perspective:
  - CTO of TELIA Finland, which is a telecom operator with various divisions focused on. Mobile networks, fixed networks, etc. TELIA owns a handful of data centres, holding also their own, applications and servers that are provided to telecom customers.

- Remarkable academic background, Professor at the University of Aalto, having authored many publications in the fields of Industrial IoT and 5G.
- Project Coordinator presented ASSIST-IoT using the official project presentation slides.
- The Project Coordinator emphasised some aspects about the call that ASSIST-IoT was submitted to (ICT-56-2020), discussing the sister projects funded, CSAs, scope of the call, etc.
- The AB member made the following remarks (early feedback) about ASSIST-IoT:
  - ASSIST-IoT is really interesting.
  - ASSIST-IoT topics are very close to Prof. Collin's specialisation, so a fruitful exchange of ideas and feedback is foreseen.
  - One of the cornerstones of ASSIST-IoT is decentralisation. Why is that put that much in the center of the proposal? Does this come from expressed industry needs or just from the targeted objective of reducing latency?
    - Project Coordinator explained that both needs drove the partners to put decentralisation as a centerpiece of ASSIST-IoT. As devices are growing in computer power, it is possible to introduce more real action in them. At the same time, drawing from the latest trends on virtualisation and containerisation, ASSIST-IoT deems preferable moving VMs (or containerised services) to the edge than moving them to the cloud. This has been requested by Industry 4.0 (some references were commented), reasoning that for (e.g., manufacturing) industries it is better to keep things within the Factory rather than relying on the cloud. More control. More security. On another note, the health sector is also advocating for such approach, increasingly requesting to do all data processing within the scope of the local router.
  - The AB member remarked that in the field of telecom operators, SDN is being widely explored, alongside to MEC; spotting processing loads closer to the base station, scheduling many things to be executed there instead of forwarding everything to the cloud.
- The Innovation Manager and the Project Coordinator mentioned the relevance of introducing disruptive business models associated to ASSIST-IoT proposition to be included as an impact of the project. One example was outlined: *I am going to put you an edge node in your company, with an associated platform for managing it. How to monetise this?*
  - With regards to the previous: during his work in TELIA, the AB member has participated in several 5G pilots across Finland. Some lessons learned out of those pilots may help ASSIST-IoT. For instance, that sharing data among heterogeneous entities is the key and opens up a whole new range of scenarios of monetising that data. For that purpose, it is very important (always) to know who owns the data, who can use it and for which purposes, establishing proper control mechanisms.
- A fruitful discussion took place about the need of relying on the edge of the network, while protecting privacy and including AI capabilities to be distributed among locations and entities:
  - The Project Coordinator reflected about some existing cases (e.g., Telefónica in Spain), that is currently advocating for decoupling network from the edge, last-mile equipment to perform processing of data. Because the edge by network operators does not provide benefit for the network operator.
  - The Technical Coordinator considered the cooperation versus competition a key debate on the context of federated learning, and how to share models to be mutually used by different entities.
  - The AB member opined that the landscape in those terms (5G, AI, Federated Learning) is very wide. A key idea to be understood which lies the very root of 5G is that such new, advanced networks do not just only care about communication anymore but focusing on giving more real-time value to each piece of data to be transmitted, accompanied with more throughput and low latency.
- The AB member some conclusive remarks (for the session) about ASSIST-IoT:
  - The future NGIoT solution will not be a single platform but different platforms developed for different use-cases being interoperable among them.
  - Another important aspect to take into account is that ASSIST-IoT (drawing from its pilots) should target a bottom-up approach, bringing innovations from local domain to be expanded to wider domains.

- Prof. Collin is looking forward to participate in joining events with ASSIST-IoT as well as planning potential joint scientific publications.

Technical Coordination team will share with the AB member technical documents. After M6, the documents will be sent to the AB members, hoping to solve in detail any question related to those topics.

The meeting concluded with the Project Coordination team indicating next steps, documentation to be signed and other managerial considerations for moving forward.

#### 4.2.6. First meeting with Mr. José García de la Guía

- Project Coordination team presented ASSIST-IoT using the official project presentation slides.
- The Technical Coordination team emphasised the objective of delivering a blueprint architecture (deliverable D3.5 ongoing) to become a reference for NGIoT deployments.
- The AB member made the following remarks (early feedback) about ASSIST-IoT:
  - It is of paramount importance to clearly identify (especially for the pilots!) the exact role of each partner.
  - For the pilots to have success, those must be tackled (prepared, put the provisions in place in terms of materials, equipment, etc.) way before their official start.
  - Sometimes, research projects are too slow on the two previous points, which clearly jeopardises their capacity to deliver actual solid results in pilots. Mr. García de la Guía remarked the potential of ASSIST-IoT in this sense.
  - Related with all the previous, the AB member strongly recommended to the Consortium managers to establish a solid, exhaustive risk management procedure, with clear observation and tracking of the risks. The RASHY matrix approach was recommended to tackle both technical and managerial risks along the project duration.

Technical Coordination team will share with the AB member technical documents. After M6, the documents will be sent to the AB members, hoping to solve in detail any question related to those topics.

The meeting concluded with the Project Coordination team indicating next steps, documentation to be signed and other managerial considerations for moving forward. In particular, the Project Coordination ended by asking Mr. García de la Guía to go through the questionnaire that was created for D3.1 survey. Having the AB member answering such questionnaire would provide a more structured feedback about the project. To be done after the first round of contacts with the AB members.

#### 4.2.7. First meeting with Dr. Harilaos Koumaras

- Project Coordinator explained the objective of AB collaboration, the need of this individual first contact and the intention to meet again (jointly with all AB members) in June 2021.
- Project Coordinator presented ASSIST-IoT using the official project presentation slides.
- Project Coordination team emphasised about the pilots that will be conducted during the action, and their relationship with heterogeneous access networks.
- The AB member made the following remarks (early feedback) about ASSIST-IoT
  - The AB member asked about the actual use of 5G in the pilots. ASSIST-IoT team clarified that the current status of the project is the in-depth definition of use cases, pilots, scenarios, etc. Additionally, the architecture (first version) is also in definition. After M6, the documents will be sent to the AB members, hoping to solve in detail any question related to those topics. However, as initial indication, the Smart Safety of Workers pilot (where ORANGE Poland participates) will put in place a local 5G deployment to carry out the trial.
  - The AB member was very interested about the open ECU that was mentioned for the Automotive pilot. ASSIST-IoT team clarified details of the open ECU that partner FORD-WERKE has brought to the project, including the details that at this point are being discussed (how to access to the data, with which frequency, using which type of communication and at which device).

- About the architecture, the AB member highlighted its ambition. In addition, Dr. Koumaras asked about which part of the system will actually be distributed and which will be centralised. At this point, the ASSIST-IoT team introduced to the AB member the concept of “enablers” and the expectations about deployment of microservices throughout the edge-to-cloud computing continuum taking advantage of tools like k3s, Akri, MicroK8s or FLEDGE. ASSIST-IoT team clarified that this is still under discussion (no final technology selected yet). Dr. Koumaras indicated his willingness to be kept posted about such endeavours, as they are closely related to the works performed in other projects in which he participates.
- Dr. Koumaras expressed admiration of the well-roundedness of the pilots, both in terms of scope and in terms of partners involved. Impression is that are relevant but feasible at the same time, supported by complete teams.

Technical Coordination team will share with the AB member technical documents. After M6, the documents will be sent to the AB members, hoping to solve in detail any question related to those topics.

The meeting concluded with the Project Coordination team indicating next steps, documentation to be signed and other managerial considerations for moving forward -

### 4.3. Recommendations

Drawing from the discussions taken place in the first meeting (see 4.2), the team of task T2.5 made a synthesis and interpretation effort in order to translate the observations from AB members into recommendations fitted to ASSIST-IoT workplan. The objective of this action was to come up with a set of actionable indications that should drive (or fine-tune) the execution of the project. The results of this activity were the following:

*Table 5. Recommendations from AB first meeting to be considered in ASSIST-IoT workplan*

Topic	Recommendation	Potential impact in the workplan
<b>Global management considerations</b>	Risk management must be taken very seriously.	Reinforcement of the team devoted to task T2.2. Risk Matrix aligned with guidelines.
	Early identification of clear specific role of each partner in the pilots	Detailed list (shared in the common repository) to stick to.
<b>Global research directions</b>	Target a bottom-up approach, clearly demonstrating benefits in a local domain (e.g., pilots) and then scaling up.	Thorough explanation of how to scalate both the product and the innovations to other industries (which ones, how...).
	Find a balance between technological innovations, privacy of the data and security	Special attention to be put in task T2.3 and T5.3. Potential additional documentation justifying that balance.
<b>Technical additions</b>	Include redundancy features (data and network)	Target this aspect in task T4.3 and in pilots (WP7) for validation.
<b>Exploitation</b>	Viability of mass production and adoption of ASSIST-IoT assets (smart devices, architecture instantiations) must not be overlooked.	Mass production of ASSIST-IoT products will be included as specific section in the Exploitation deliverables (T9.4).
	A key aspect for monetising results out of a edge-to-cloud approach is to consider protection, ownership and sharing features of the data from different stakeholders.	Consideration if the data sharing (e.g., data market) approaches are finally including (e.g., IDSA).
<b>Standardisation</b>	Prepare the outcomes of ASSIST-IoT and document them following IEEE template in order to be considered candidates for standard/pre-normative.	Action point to be added to T9.3 task list.

## 5. Next actions

According to the plan and the recommendations provided in the first meeting(s), the most immediate actions are the following:

- To obtain early feedback by the AB members in a more structured manner. With this purpose, the survey prepared in deliverable D3.1 has been asked to be fulfilled from their side.
- To share the first round of technical deliverables (being completed in M6, at the same time than this document).
- To arrange a general assembly (with all AB members and various ASSIST-IoT representatives) for June 2021 (M8 of the project).
- To prepare documentation, next actions and update of the plan settled in this document towards the meeting in M8.
- To apply recommendations in Table 5 in the different points of the workplan. These hints must be shared by the Project Coordination to all WP leaders to ensure proper addressment across parallel tasks.
- To keep continuous communication with AB members in case of potential joint-collaboration opportunities (e.g., dissemination events, EU-IoT organised calls, etc.).

## 6. Conclusions

The interaction with Advisory Board members has just started. Only 4 months have been conducted of a task that is planned to last till the end of the project. However, it can be considered that fruitful, useful, relevant advances have already been reached. A first series of recommendations have been gathered coming from a suite of renowned experts forming the AB group of the project. Besides, a solid plan has been outlined that should (according to T2.5) suffice to meet the goals set for AB role in ASSIST-IoT.

The Consortium expects to keep up with the good work on this regard and perform a successful, mutually beneficial interchange with AB members throughout all the project duration.

# Appendix A - CV of AB members

## A.1 - Dr. Konstantinos Karachalios

A globally recognised leader in standards development and intellectual property, Dr. Ing. Konstantinos Karachalios is managing director of the IEEE Standards Association and a member of the IEEE Management Council.

As managing director, he has been enhancing IEEE efforts in global standards development in strategic emerging technology fields, through technical excellence of staff, expansion of global presence and activities and emphasis on inclusiveness and good governance, including reform of the IEEE standards-related patent policy.

As member of the IEEE Management Council, he championed expansion of IEEE influence in key technological areas, including consideration of social and ethical implications of technology, according to the IEEE mission to advance technology for humanity. Results have been rapid in coming and profound; IEEE is becoming the place to go for debating and building consensus on issues such as a trustworthy and inclusive Internet and ethics in design of autonomous systems.

Before IEEE, Konstantinos played a crucial role in successful French-German cooperation in coordinated research and scenario simulation for large-scale nuclear reactor accidents. And with the European Patent Office, his experience included establishing EPO's patent academy, the department for delivering technical assistance for developing countries and the public policy department, serving as an envoy to multiple U.N. organizations.

Konstantinos earned a Ph.D. in energy engineering (nuclear reactor safety) and masters in mechanical engineering from the University of Stuttgart.

(Extracted from LinkedIn)

## A.2 - Prof. Ivana Podnar Žarko

Ivana Podnar Žarko is a Full Professor at the Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia (UNIZG-FER), where she teaches courses on distributed information systems and the Internet of Things. She received her B.Sc., M.Sc. and Ph.D. degrees in Electrical Engineering from UNIZG-FER, in 1996, 1999 and 2004, respectively.

She is affiliated with the Department of Telecommunications of UNIZG-FER since 1997. She was a visiting researcher and research associate at the Technical University of Vienna, Austria, and a postdoctoral researcher at the Swiss Federal Institute of Technology in Lausanne (EPFL), Switzerland. In December 2017, she was promoted to Full Professor and currently leads the [Internet of Things Laboratory](#) of UNIZG-FER.

Prof. Žarko has participated in 9 research projects funded by national and EU funds in the last 5 years and was the Technical Manager of the H2020 project [symbIoTe: Symbiosis of smart objects across IoT environments](#) (2016-2018). She is currently leading two national projects: [IoT-Field](#) funded by European Structural and Investment Funds, and [IoT4us](#) funded by Croatian Science Foundation. She is also participating as a researcher in the Centre of Research Excellence for Data Science and Advanced Cooperative Systems, which is the first national center of excellence in the field of technical sciences in Croatia.

She has co-authored more than 70 scientific journal and conference papers in the area of large-scale distributed systems, IoT, and Big data processing. Recently she focuses on research problems related to IoT interoperability and Distributed Ledger Technology (DLT). She has served as a program committee member for many international conferences and workshops (e.g., IEEE Globecom, IEEE 5G World Forum, Global IoT Summit, IEEE ICC) and was a co-organizer of a series of research workshops Int. Workshop on Interoperability and Open Source Solutions for the IoT (InterOSS-IoT) from 2014. She was a track chair of the 19th Annual IEEE/ACM Int. Symposium in Cluster, Cloud, and Grid Computing (CCGrid 2019) and a member of the editorial board of *Automatika: Journal for Control, Measurement, Electronics, Computing and Communications* since 2016.

Prof. Ivana Podnar Žarko is a member of IEEE and was the Chapter Chair of IEEE Communications Society, Croatia Chapter (2011-2014). She has received an award for engineering excellence from the IEEE Croatia Section in 2013 and the Science Award from UNIZG-FER in 2020 for outstanding achievements in research and innovation in the last 5 years.

Further information:

1. Professional web page: [https://www.fer.unizg.hr/ivana.podnar\\_zarko](https://www.fer.unizg.hr/ivana.podnar_zarko)
2. [Google Scholar profile](#): h-index=25

### A.3 - Mr. José García de la Guía

Mr. José García de la Guía is a Telecommunications Engineer in Universitat Politècnica de València that currently holds the position of CIO in the worldwide logistics company TIBA LOGISTICS. After several years of technical work (developer, project manager, etc.), José became General Manager of INFOPORT Valencia at 1998. Since then, José held different positions in companies related and interconnected with the Port of Valencia (Valencia Port Foundation, the research-oriented branch of the port), joining finally the Port Authority (Autoridad Portuaria de Valencia), where he worked for more than 11 years as Innovation Manager (2007-2011), Manager of the Port Community System (2011-2019) and Information Technology Manager (2014-2019). Since April 2019, is the CIO of TIBA Logistics.

The expertise of José García is the innovation in maritime ports, especially focused on the digitalisation of services, utilisation of modern technologies and participation in research projects (both public funded and private-promoted).

### A.4 - Dr. Harilaos Koumaras

**Dr. Harilaos Koumaras** was born in Athens, Greece in 1980. Currently Dr. Koumaras is a research assistant professor at the Institute of Informatics and Telecommunications of NCSR “Demokritos”. He received his BSc degree in Physics in 2002 from the University of Athens, Physics Department, his MSc in Electronic Automation and Information Systems in 2004, being scholar of the non-profit organization [Alexander S. Onassis](#), from the University of Athens, Computer Science Department and his PhD in 2007 at Computer Science from the University of Athens, Computer Science Department, having granted the four-year scholarship of National Centre of Scientific Research “[Demokritos](#)”. He has received twice the Greek State Foundations ([IKY](#)) scholarship during the academic years 2000-01 and 2003-04. He has also granted with honors the classical piano and harmony degrees from the classical music department of [Attiko Conservatory](#).

**Research Activities.** Dr. Koumaras has been an active research associate since 2003 of Media Net Lab at the National Centre of Scientific Research “Demokritos” and since then he has participated in numerous EU-funded and national funded projects, collaborating with various universities (e.g. University of Bordeaux, Plymouth University, University of the Basque Country, Universitat Politècnica de Catalunya) and enterprises (e.g. Vodafone, Ericsson, Intel) with presentations and publications at international conferences, scientific journals and book chapters. His research interests include objective/subjective evaluation of the perceived quality of multimedia services, video quality and picture quality evaluation, video traffic modeling, digital terrestrial television and video compression techniques. Currently, he is the author or co-author of more than 100 scientific papers in international journals, technical books and book chapters, numbering at least 1100 non-self citations.

**Business and Innovation Activities.** Dr. Koumaras, since 2016, is the co-founder of the [INFOLYSiS P.C.](#) an innovative start-up company based in Athens, focusing on commercializing innovative smart home and IoT solutions by utilizing chatbots apps of popular messaging services (Viber, Messenger, Skype). Thus, INFOLYSiS develops custom-made chatbot solutions hosted at serverless environments, where the user can interact via a chatting interface with a Smart Home environment or retrieve data from an IoT domain or control connected smart devices. INFOLYSiS is a Viber Trusted Partner for chatbot apps design and development in Greece, having developed the first commercial Viber chatbot in Greece ([link](#)). At the backend of the smart home and IoT solution, INFOLYSiS has developed and commercialized a Docker-based interoperable IoT GW, which is able of interconnecting sensors of different data protocols, providing a unified monitored IoT domain. This Docker-based GW is complemented by the use of containerized mapping functions (i.e. proxies) between popular data protocols, such as CoAP, MQTT etc.

**Teaching Activities.** Between 2004 and 2009 Dr. Koumaras is a principal lecturer at the Business College of Athens ([BCA](#)) and an adjunct lecturer at the City University of Seattle, teaching modules related to Information Technology, Networking, Mathematics, Innovation and Logic. In 2009, he was elected as the Head of the Computer Science Department of BCA, coordinating the respective franchised computing courses of London Metropolitan University till 2014, when he joins as an adjunct assistant professor the faculty team of Hellenic American University for the academic year 2014-2015.

**Achievements.** Dr. Koumaras expertise in the field of ICT has been widely recognized by serving as an independent expert on behalf of the European Commission by auditing the progress of funded FP7 project and evaluating FP7 and H2020 research proposals. For the period 2014-today, Dr. Koumaras has been positioned as Co-Chair of the IEEE Interest Group on Multimedia Content Distribution of the IEEE Multimedia Communication Technical Committee (MMTC). Since 2009, he has also joined the editorial board member of the Telecommunications Systems Journal and he has acted as a reviewer at numerous prestigious journals and magazines. In 2018, Dr. Koumaras successfully received for NCSR “D” € 1,272,000.00 EU funding for the project 5GENESIS (total funding €15,796,863.51), involving 26 partners from the academia and the industry at the early deployment of 5G testbeds across Europe. Dr. Koumaras appointed the role of the project manager for 5GENESIS project.

(Extracted from <https://koumaras.wordpress.com/whoiswho/>)

## **A.5 - Prof. Joydeep Mitra**

## POSITION AND CONTACT INFORMATION

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## SUMMARY VITAE

**Education:** Ph.D., Texas A&M University, College Station;  
B.Tech., Indian Institute of Technology, Kharagpur.

**Experience:** 21 years academic, 5 years industry and consulting.

**Major Awards and Honors:**

PMAPS Merit Award 2020 (from Int'l Society for Probabilistic Methods Applied to Power Systems);  
IEEE Power & Energy Society Roy Billinton Power System Reliability Award, 2019;  
Fellow, IEEE, for contributions to the development of power system reliability methods, 2019;  
NSF CAREER Award, 2002.

**Technical Publications and Patents:** 225

Publications: 3 books, 7 book chapters, 52 journal articles, 146 conference articles, 14 technical reports;  
Patents: 3 issued.

**Research and Education Grants:** 17 research and education grants and contracts, totaling over \$6.3M.

**Education, Training and Mentoring:**

22 different Electrical Engineering courses, including laboratory courses;  
26 Short Courses, Tutorials, and Workshops in U.S. and abroad, majority offering lifelong learning/  
professional development credits;  
Student Advising and Mentoring: 6 Post-docs, 11 Ph.D. and 16 M.S. (thesis option); 5 Doctoral and 1  
Post-doctoral alumni in academia.

**Leadership and Synergistic Activities:**

IEEE-PES Distinguished Lecturer;  
Vice-Chair, IEEE-PES Fellow Evaluation Committee (2021–present);  
Chair, PES Outstanding Young Engineer Award Committee (2021–present);  
Associate Editor, IEEE Transactions on Power Systems and Power Engineering Letters (2016–present);  
Associate Editor, IEEE Transactions on Industry Applications (2019–present);  
Associate Editor, International Transactions on Electrical Energy Systems (2017–19);  
Associate Editor, IEEE Transactions on Smart Grid and Power Engineering Letters (2010–15);  
Associate Editor, Journal of Renewable Energy (2012–17);  
Chair, IEEE-PES Technical Co-sponsoring Steering Committee (2014–18);  
Chair, IEEE-PES Analytic Methods for Power Systems Committee (2015–16);  
Chair, IEEE-PES Research Subcommittee (2015–17);  
Chair, IEEE-PES Reliability, Risk and Probability Applications Subcommittee (2009–11);  
Chair, IEEE-PES Student Meetings Subcommittee (2005–07);  
Associate Director, Electric Utility Management Program, New Mexico State University (2003–08);  
Other: Organized and Chaired two Conferences; Technical Committee Program Chair at three major  
IEEE-PES Conferences; Delivered 71 invited talks, including 11 keynote and 19 panel presentations.

**Extramural Outreach:**

Testified before Public Utilities Commission of Ohio regarding grid modernization in Ohio;  
Provided advice to Federal Bureau of Investigation on matters concerning electric power grid security;  
Given interviews to Washington Post, Baltimore Sun, and several local news agencies.

## DETAILED VITAE

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### AREA OF INTEREST

Electric Power and Energy Systems

Present Research Focus

- energy assurance • infrastructure resilience • smart grid architecture • microgrid architecture
- power grid reliability and reliability-based planning • power grid security, stability and control

Broad Area

- reliability analysis • distributed energy resources and microgrids • resource and network planning
- industry deregulation • energy market modeling, simulation and analysis • energy risk management
- power flow analysis and optimization • stability analysis • power system control • state estimation

### EDUCATION

**Doctor of Philosophy**, Electrical Engineering

[Texas A&M University](#), College Station, TX 77843

**Bachelor of Technology (Honors)**, Electrical Engineering

[Indian Institute of Technology](#), Kharagpur 721302, India

### ACADEMIC EXPERIENCE

#### Appointments

[Michigan State University](#), East Lansing, MI 48824 (2008–present)

August 2008 to present

**Professor**, [Department of Electrical & Computer Engineering](#)

(Associate Professor, 2008–20; Professor, 2020–present; tenured 2014)

**Director**, Energy Reliability & Security ([ERiSe](#)) Laboratory

**Senior Faculty Associate**, [Institute of Public Utilities](#)

[New Mexico State University](#), Las Cruces, NM 88003 (2003–2008)

August 2003 to August 2008

**Associate Professor**, [Klipsch School of Electrical & Computer Engineering](#)

(Assistant Professor, 2003–04; Associate Professor, 2004–08; tenured 2006)

**Associate Director**, [Electric Utility Management Program](#)

[North Dakota State University](#), Fargo, ND 58105 (2000–2003)

August 2000 to August 2003

**Assistant Professor**, [Department of Electrical & Computer Engineering](#)

#### Research Projects

Funding information is listed in [Research and Educational Grants](#) section.

Ongoing:

- “Models for Evaluation and Optimization of Grid-Scale Energy Storage,” supported by US Department of Energy/Sandia National Laboratories;
- “Application of Utility-Scale Battery Storage in Power Distribution System,” supported by Consumers Energy Corporation;
- Toward Self-healing Microgrids: Autonomous Control, Adaptive Protection and Auto-reconfiguration of Active Distribution Systems;
- Reliability and Stability Performance in the Presence of Variable Generation;
- Infrastructure Resiliency During Extreme Events.

**Completed:**

- “A Lyapunov Function Based Remedial Action Screening Tool Using Real-Time Data,” supported by US Department of Energy;
- “Impacts of Power Flow Control in Distribution Systems,” supported by Michigan Economic Development Corporation;
- “Transformer-less Unified Power Flow Controller for Wind and Solar Power Transmission,” supported by ARPA-E;
- “Impact of Increased Renewable Generation Resources Across the MISO Zone 7 Footprint,” supported by Consumers Energy Corporation;
- “A Holistic Approach to Customer-driven Microgrids,” supported by National Science Foundation;
- “Optimal Fuel-Switching in CoGen Plant to Meet Environmental and Operational Constraints,” supported by T. B. Simon Power Plant;
- “Reliability-Driven Microgrid Architecture,” supported by National Science Foundation;
- “Optimal Resource Deployment in Surety Microgrids,” supported by Sandia National Laboratory;
- “Storage Optimization in Surety Microgrids,” supported by Sandia National Laboratory;
- “Advanced Transformer Modeling for Transients Simulation,” supported by Bonneville Power Administration;
- “A Real Time Price Signal Driven Demand Management System,” supported by Otter Tail Power Company;
- “Dynamic Modeling of Large Induction Motors for Stability and Load Flow Studies,” supported by Otter Tail Power Company;
- “Dynamic Ratings of Transmission Lines, Transformers, Traps and Current Transformers,” supported by Otter Tail Power Company.

**Mentoring and Student Advising**

**Currently Advising:**

1. Atri Bera (Ph.D., passed comprehensive exam, expected to graduate in 2021);
2. Khalil Sinjari (Ph.D., passed qualifying exam, expected to graduate in 2023);
3. Saad Alzahrani (M.S.).

**Post-doctoral Associates:**

1. Dr. Aysun Koksall (Post-doc, 2018–19, now Asst. Prof. at Beykent University, Istanbul, Turkey);
2. Dr. Nga Nguyen (Post-doc, 2017–18, now Asst. Prof. at University of Wyoming, Laramie, WY);
3. Dr. Mohammed Ben-Idris (Post-doc, 2015–16, now Asst. Prof. at University of Nevada, Reno, NV);
4. Dr. Salem El-Saiah (Post-doc, Fall 2015, now Asst. Prof. at SUNY Maritime College, Bronx, NY);
5. Dr. Niannian Cai (Post-doc, Fall 2014, now with Schweitzer Engineering, Pullman, WA);
6. Dr. Xufeng Xu (Post-doc, 2009–11, now with American Electric Power, Columbus, OH).

**Doctoral Alumni:**

1. Saleh Al-Masabi (May 2019; now Asst. Professor at Najran University, Najran, Saudi Arabia);
2. Yuting Tian (Dec 2018; now with Argonne National Laboratory, Argonne, IL);
3. Nga Nguyen (Aug 2017; now Asst. Professor at University of Wyoming, Laramie, WY);
4. Samer Sulaeman (May 2017; now Asst. Professor at Tennessee State University, Nashville, TN);
5. Salem El-Saiah (Aug 2015; now Asst. Professor at SUNY Maritime College, Bronx, NY);
6. Mohammed Ben-Idris (Dec 2014; now Asst. Professor at University of Nevada, Reno, NV);
7. Niannian Cai (Aug 2014, now with Schweitzer Engineering Laboratories, Pullman, WA);
8. Mallikarjuna Vallem (Aug 2009, now with Pacific Northwest National Laboratory, Richland, WA);
9. Shashi Patra (May 2007, now with GE Grid Solutions, Redmond, WA).

Master's Alumni (thesis option; non-thesis advisees not listed):

1. Fares Al-Harbi (May 2018);
2. Valdama Johnson (Dec 2016);
3. Khaleel Khadedah (Aug 2015);
4. Elicia Sashington (Dec 2014);
5. Yuting Tian (Aug 2014);
6. Mohamed Esreraig (May 2012);
7. Sirisha Tanneeru (Dec 2008);
8. Ramakanth Tondupally (Dec 2008);
9. Heidi Shray (Dec 2007);
10. Aleen Mohammed (Dec 2007);
11. Yashwant Patil (Dec 2006);
12. Ramesh Earla (Aug 2005);
13. Narendra Aeron (May 2004);
14. Julian Feng (Aug 2003);
15. Ryan Retzlaff (May 2003).

### **Courses Taught**

At Michigan State University:

- Power System Reliability (ECE 824);
- Power System Stability and Control (ECE 823);
- Operation of Modern Electric Grids (ECE 802);
- Power System Analysis (ECE 423);
- Power System Laboratory (ECE 420);
- Energy Conversion and Power Electronics (ECE 320);
- Electronic Circuits (ECE 302).

At New Mexico State University:

- Power Systems I (EE 332);
- Power Systems II (EE 432/542);
- Power Systems III (EE 493/543);
- Power System Reliability and Risk Assessment (EE 535);
- Power System Relaying (EE 534);
- Energy Economics (EE 490/590); one of four faculty in team-taught course.

At North Dakota State University:

- Power System Protection (ECE 731);
- Power Distribution (ECE 733);
- Machines and Controls Lab (ECE 402);
- Power Systems Design (ECE 433/633);
- Energy Conversion (ECE 331);
- Electrical Engineering II (ECE 303);
- Electrical Engineering Lab I (ECE 306).

At Texas A&M University (as Assistant Lecturer, during Doctoral program):

- Electromechanical Energy Conversion (ELEN 338);
- Electric Circuit Theory and Instrumentation (ELEN 306).

## INDUSTRY EXPERIENCE

May 1997 to July 2000

### Senior Consulting Engineer

[LCG Consulting](#), 4962 El Camino Real, Suite 112, Los Altos, CA 94022

- Nature of work: Performed proprietary research and developed models and algorithms for generation production and energy market simulation and analysis. Worked on the development of *UPLAN-NPM*, an integrated utility planning and market simulation tool, and *GeneratorX*, an expansion planning tool.
- R&D and Coding: Incorporated numerous features and improvements in *UPLAN-NPM*, including: energy market risk management model that optimizes energy and derivative portfolios; an uncertainty module which enables *UPLAN-NPM* to simulate random variations in several market and environmental variables; capability to assess wheeling charges; improved models for unit commitment and dispatch, including loss compensation when using the optional linearized model; data verification/identification of suspicious data in generation, transmission and load databases; response surface model for rapid estimation of electricity prices.

July 1989 to August 1991

### Electrical Engineer

[The Tata Iron & Steel Company](#), Jamshedpur 831001, India

- Nature of work: Installation, on-site testing, and commissioning of new electrical equipment in the plant, such as cables, overhead lines, isolators, circuit breakers, relays, metering instruments, inverters, converters, motors, starters (DOL and star-delta), and controllers (both relay logic controllers and programmable logic controllers).
- Major Project: Directed complete electric installation on an Electric Overhead Traction Crane. Installation work included mounting, interconnection, on-site modification and testing, and commissioning of all equipment—two hoist motors, four traction motors, control panels, resistance panels, controller units in operator's cabin, as well as burden weight sensors and instrumentation equipment.

## PROFESSIONAL AND COMMUNITY SERVICE

### Editorial and Review

- Associate Editor:
  - IEEE Transactions on Power Systems and Power Engineering Letters (2016–present);
  - IEEE Transactions on Industry Applications (2019–present);
  - International Transactions on Electrical Energy Systems (2017–19);
  - IEEE Transactions on Smart Grid and Power Engineering Letters (2010–2015);
  - Journal of Renewable Energy (2012–2017).
- Panel Review for the National Science Foundation (14 panels between 2001 and 2020).
- Site Visit for the National Science Foundation (2013).
- Proposal Review for the US Department of Energy and ARPA-E (2019, 2015, 2010, 2009).
- Project Peer Review for the US Department of Energy (2017).
- Review of proposals submitted to the Los Alamos National Laboratory (2012), South Africa National Research Foundation (2012, 2011), NIREC (2010), MD-DERP (2010) and ND-EPSCoR (2002).
- Review of manuscripts submitted for publication in:
  - IEEE Transactions on: Power Systems; Power Delivery; Energy Conversion; Smart Grid; Sustainable Energy; Power Electronics;
  - IET Journals: Generation Transmission and Distribution; Renewable Power Generation;
  - International Journal of Electrical Power and Energy Systems;
  - International Transactions on Electrical Energy Systems;

- Electric Power Systems Research;
- Journal of Renewable Energy;
- IEEE Power Engineering Society Conferences; IEEE International Symposium on Circuits and Systems; Other IEEE-sponsored and technically co-sponsored conferences.
- Books, book chapters and book proposals for publishers.
- External reviewer for doctoral students in international universities.

### **Technology Leadership**

1. Discussion Lead: “Metrics: Reliability, Resilience, Energy and Market Efficiency” breakout session moderator at NSF Workshop on Grid at the Edge, Online, March 23–24, 2021.
2. Participant: NSF Workshop on Near-Term Research Needs for the Physical and Cyber Infrastructure that Supports the Future Grid, Washington, DC, May 4–5, 2015.
3. Discussion Lead: “Integration of Renewables, Markets” breakout session moderator at NSF National Workshop on Energy Cyber-Physical Systems, Washington, DC, Dec 16–17, 2013.
4. Participant: DOE Workshop on Advanced Grid Modeling, Knoxville, TN, Feb 5–6, 2013.
5. Discussion Lead: “Smart Grids” breakout session facilitator at Great Lakes Alliance for Sustainable Energy Research (GLASER) Workshop III, Chicago, IL, Feb 18, 2010.
6. Participant: NSF-NIST National Workshop on Research Directions for Future Cyber-Physical Energy Systems, Baltimore, MD, June 3–4, 2009.
7. Discussion Lead: “Smart Grids” breakout session facilitator at GLASER Workshop II, Chicago, IL, May 26, 2009.
8. Participant: NSF Workshop on the Future Power Engineering Workforce, Washington, DC, Nov 29–30, 2007.
9. Participant: Workshop on Power System Security, sponsored by Indian Ministry of Power, Kharagpur, India, Jan 13–14, 2006.
10. Participant: NSF-EPRI Workshop on Understanding and Preventing Cascading Failures, Denver, CO, Oct 27–28, 2005.
11. Participant: DOE Workshop on National Electric Delivery Technologies Roadmap, Washington, DC, July 8–9, 2003.
12. Participant: NSF/EPRI/DOE Workshop on Future Research Directions for Complex Interactive Electric Networks, Washington, DC, Nov 16–17, 2000.

### **Short Courses, Workshops and Tutorials**

1. Short Course: *Grid School Part I*, East Lansing, MI, March 9–11, 2021. 12 hours of instruction. Team-taught, with 4 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
2. Short Course: *Grid School*, East Lansing, MI, May 4–5, 2020. 12 hours of instruction. Team-taught, with 4 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
3. Short Course: *Vermont Grid Training Program*, at Efficiency Vermont, Burlington, VT, March 2–3, 2020. 12 hours of instruction. Co-instructors: Janice Beecher and Kenneth Rose.
4. Short Course: *Grid School*, East Lansing, MI, May 4–6, 2019. 18 hours of instruction. Team-taught, with 6 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
5. Short Course: *Grid School*, East Lansing, MI, April 9–12, 2018. 24 hours of instruction. Team-taught, with 10 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
6. Short Course: *Grid School*, East Lansing, MI, March 27–30, 2017. 24 hours of instruction. Team-taught, with 11 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
7. Short Course: *Grid School*, Charleston, SC, March 7–10, 2016. 24 hours of instruction. Team-taught, with 6 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.

8. Short Course: *Grid School*, Chicago, IL, March 9–12, 2015. 24 hours of instruction. Team-taught, with 7 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
9. Workshop: *CHP Training Workshop*, Baton Rouge, LA, June 25, 2014. 6.5 hours of instruction. Team-taught, with 5 co-instructors. Conducted by the Louisiana State University Center for Energy Studies for the Louisiana Public Service Commission.
10. Short Course: *Grid School*, Charleston, SC, March 3–6, 2014. 24 hours of instruction. Team-taught, with 9 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
11. Short Course: *Power System Fundamentals*, East Lansing, MI, August 9, 2013. 6 hours of instruction. Organized by the Institute of Public Utilities, Michigan State University, for the Michigan Public Service Commission.
12. Short Course: *Grid School*, Charleston, SC, March 4–7, 2013. 24 hours of instruction. Team-taught, with 8 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
13. Short Course: *Grid School*, Charleston, SC, March 5–8, 2012. 21 hours of instruction. Team-taught, with 6 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
14. Workshop: *Building an Education and Research Program on Power & Energy Systems*, Madanapalle, AP, India, June 27–July 1, 2011. 30 hours of instruction. Organized by the Indo-US Collaboration for Engineering Education (IUCEE).
15. Short Course: *Grid School*, Charleston, SC, March 7–11, 2011. 27 hours of instruction. Team-taught, with 10 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
16. Short Course: *Hawaii PUC Grid School*, at the Hawaii Public Utilities Commission, Honolulu, HI, December 13–15, 2010. 18 hours of instruction. Co-Instructors: Kenneth Rose, Thomas Veselka and Guenter Conzelmann (Argonne National Laboratory).
17. Short Course: *Louisiana Grid Training Program*, at the Center for Energy Studies, Louisiana State University, Baton Rouge, LA, October 21–22, 2010. 12 hours of instruction. Co-Instructor: Kenneth Rose.
18. Short course: *North Carolina Grid Training Program*, at the North Carolina Utilities Commission, Raleigh, NC, May 11–12, 2010. 12 hours of instruction. Co-Instructor: Kenneth Rose.
19. Short Course: *Grid School*, Richmond, VA, March 8–12, 2010. 27 hours of instruction. Team-taught, with 10 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
20. Tutorial: *Reliability of Sustainable Energy Systems*, at the International Conference on Power Systems—2009, Kharagpur, India, December 27, 2009.
21. Short course: *Electric Power System Reliability Evaluation*, at the Indian Institute of Technology, Kharagpur, January 9–12, 2006. 16 hours of instruction. Co-Instructor: C. Singh (Texas A&M University).
22. Short course: *Life Extension of Substations*, at New Mexico State University, Las Cruces, August 10–11, 2006. 12 hours of instruction. Co-Instructor: Gene Wolf (Public Service Company of New Mexico).
23. Short course: *Fundamentals of Electric Power System Analysis*, at New Mexico State University, Las Cruces, August 13–15, 2007. 18 hours of instruction. Co-Instructors: H. A. Smolleck and S. J. Ranade (New Mexico State University).
24. Short course: *Fundamentals of Electric Power System Analysis*, at New Mexico State University, Las Cruces, August 7–9, 2006. 18 hours of instruction. Co-Instructors: H. A. Smolleck and S. J. Ranade (New Mexico State University).
25. Tutorial: *Electric Delivery System Reliability Evaluation*, at the IEEE-PES Annual General Meeting—2006, Montreal, Quebec, on June 21, 2006. 7 hours of instruction. One of seven instructors.
26. Tutorial: *Electric Delivery System Reliability Evaluation*, at the IEEE-PES Annual General Meeting—2005, San Francisco, CA, on June 12, 2005. 7 hours of instruction. One of seven instructors.

## Invited Talks

### Conference Keynote Talks

1. *Reliability Impact of Low-Inertia Generation*. Keynote talk at the *2020 National Power System Conference*, Gandhinagar, India, Dec 19, 2020.
2. *Reliability Impact of Low-Inertia Generation*. Keynote talk at the *2020 Student Conference on Engineering & Systems*, Prayagraj, India, July 10, 2020.
3. *Energy Assurance with Renewable Generation*. Keynote talk at the *2019 International Conference on Computing, Power and Communication Technologies*, New Delhi, India, Sep 27, 2019.
4. *Energy Assurance with Renewable Generation*. Keynote talk at the *IEEE PowerAfrica Conference*, Cape Town, South Africa, June 28, 2018.
5. *Reliability-Based Storage Sizing for Mitigation of Variability of Renewable Generation*. Keynote talk at the *Electrical Energy Storage Applications and Technologies Conference*, San Diego, CA, Oct 11, 2017.
6. *Emerging Technological Opportunities in Smart Grids*. Keynote talk at the *International Conference on Intelligent Control, Power and Instrumentation*, Kolkata, India, Oct 22, 2016.
7. *Energy Assurance with Renewable Generation*. Keynote talk at the *International Forum on "The Belt and Road" Energy Internet*, Chengdu, China, May 28, 2016.
8. *Energy Assurance with Renewable Generation*. Keynote talk at the *12th IEEE India International Conference (INDICON)*, New Delhi, India, Dec 19, 2015.
9. *Reliable Delivery of Renewable Energy*. Keynote talk at the *International Conference and Utility Exhibition on Green Energy for Sustainable Development*, Pattaya City, Thailand, Mar 21, 2014.
10. *Energy Assurance in an Age of Variable Generation*. Keynote talk at the *45th Annual Frontiers of Power Conference*, Stillwater, OK, Oct 30, 2012.
11. *Secure Power Systems Through Autonomous Microgrids*. Keynote talk at the *5th WSEAS International Conference on Circuits, Systems, Electronics, Control & Signal Processing*, Dallas, TX, Nov 1, 2006.

### Conference Panel Talks

12. *Modeling Energy Storage for Improving Power System Performance in Presence of Renewable Energy*. Panel presentation at the *IEEE Green Technologies Conference*, Virtual Conference, April 7–9, 2021. Co-presenter: A. Bera.
13. *Architecture for a Self-Sufficient Microgrid*. Panel presentation at the *IEEE-PES Annual General Meeting*, Montreal, QB, August 4, 2020.
14. *Reliability Impact of Low-Inertia Generation*. Panel presentation at the *IEEE Sustainable Power & Energy Conference*, Beijing, China, Nov 23, 2019.
15. *Resilience Evaluation of Future Power Grids*. Panel presentation at the *IEEE-PES Annual General Meeting*, Atlanta, GA, August 7, 2019. Co-presenter: M. Benidris.
16. *An Introduction to Distribution Automation*. Panel presentation at the *PowerForward Ohio Phase 2 Conference*, Public Utilities of Ohio (PUCO), Columbus, OH, July 26, 2017.
17. *Homotopy-based Method for Rapid Screening of Dynamic Contingencies*. Panel presentation at the *IEEE-PES Annual General Meeting*, Boston, MA, July 21, 2016. Co-presenter: M. Benidris.
18. *Real-Time Remedial Action Screening Using Direct Stability Analysis Methods*. Panel presentation at the *IEEE-PES Annual General Meeting*, Washington, DC, July 31, 2014. Co-presenter: M. Benidris.
19. *Engineering of Storage for Mitigation of Variability*. Panel presentation at the *IEEE-PES Annual General Meeting*, Washington, DC, July 31, 2014.
20. *Reliability-Based Storage Sizing for Island-Capable Microgrids*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Chicago, IL, Apr 17, 2014.
21. *Distributed Analytics for Steady State Operation of Autonomous Microgrids*. Panel presentation at the *IEEE-PES Annual General Meeting*, San Diego, CA, July 25, 2012.
22. *Intelligent Methods for Smart Microgrids*. Panel presentation at the *IEEE-PES Annual General Meeting*, Detroit, MI, July 26, 2011.

23. *System Analytics for Smart Microgrids*. Panel presentation at the *IEEE-PES Annual General Meeting*, Minneapolis, MN, July 29, 2010.
24. *Planning for a Sustainable Transmission and Distribution System*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, New Orleans, LA, Apr 22, 2010.
25. *The National Science Foundation and Its Quest for Tomorrow's Academic Leaders*. Panel presentation at the *Power System Conference and Exposition*, Seattle, WA, Mar 17, 2009.
26. *The National Science Foundation and Its Quest for Tomorrow's Academic Leaders*. Panel presentation at the *IEEE-PES Annual General Meeting*, Pittsburgh, PA, July 24, 2008.
27. *Application of Computational Intelligence in Optimal Expansion of Distribution Systems*. Panel presentation at the *IEEE-PES Annual General Meeting*, Pittsburgh, PA, July 23, 2008.
28. *Microgrid Evolution: New Paradigms Drive New Architectures*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Chicago, IL, Apr 24, 2008.
29. *Toward Understanding Catastrophic Failure Modes in Power Systems*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Dallas, TX, May 22, 2006.
30. *A Self-Supporting Microgrid Achievable with Today's Technology*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Dallas, TX, May 22, 2006.

#### **Lecture Series and Other Invited Talks**

31. *Design of Modern Microgrids: Architecture, Control and Protection*. Invited talk (*Sprint Lecture Series*) at Department of Electrical and Computer Engineering, Florida State University, Tallahassee, FL, Nov 16, 2012.
32. *Long-term Planning of Generation, Transmission and Distribution Assets*. Invited talk (*Smart Grid Lecture Series*) at Los Alamos National Laboratory, Los Alamos, NM, Nov 16, 2009.
33. *Stewardship of Energy Innovation and Education*. Invited talk at the National Science Foundation, Washington, DC, Oct 7, 2009.
34. *Preventing Catastrophic Failures in Power Systems*. Invited talk at the *Workshop on Power System Security*, sponsored by the Ministry of Power, India. Kharagpur, Jan 13–14, 2006.
35. *Reliability of Electric Power Systems*. Invited talk at the Electrical Power Department, Tata Iron & Steel Company, Jamshedpur, India, Aug 22, 1995.

#### **University Seminars and Colloquia**

##### *International*

36. Department of Electrical Engineering, Tsinghua University, Beijing, China, Nov 23, 2019.
37. School of Electrical Engineering, Chongqing University, Chongqing, China, Nov 22, 2019.
38. Department of Electrical Engineering, Indian Institute of Technology, Kharagpur, Oct 1, 2019.
39. Department of Electrical Engineering, Madan Mohan Malaviya University of Technology, Gorakhpur, India, Sep 26, 2019.
40. Department of Electrical Engineering, Indian Institute of Technology, Madras, Sep 26, 2018.
41. School of Electrical Engineering and Information, Sichuan University, Chengdu, China, May 30, 2016.
42. Institute of Energy and Automation Technology, Technische Universität Berlin, Berlin, Germany, August 15, 2014.
43. School of Environment, Resources and Development (SERD), Asian Institute of Technology, Bangkok, Thailand, June 18, 2010.
44. Department of Electrical & Electronic Engineering, Imperial College, London, UK, July 10, 2008.
45. Department of Electrical Engineering, Indian Institute of Technology, Kharagpur, Jan 15, 2008.
46. Department of Electrical Engineering, Indian Institute of Technology, Kanpur, Jan 10, 2008.
47. Department of Electrical Engineering, Indian Institute of Technology, Bombay, Jan 13, 2006.
48. Department of Electrical Engineering, University of Manitoba, Winnipeg, Oct 10, 2002.
49. Department of Electrical Engineering, Indian Institute of Technology, Kharagpur, Aug 23, 1995.

### *Domestic*

50. School of EECS, Louisiana State University, Baton Rouge, LA, Feb 4, 2020.
51. Department of ECE, Iowa State University, Ames, IA, Jan 21, 2020.
52. Department of EBME, University of Nevada–Reno, Reno, NV, Apr 8, 2019.
53. Department of ECE, Purdue University, West Lafayette, IN, Feb 28, 2019.
54. Department of EECS, University of Michigan, Ann Arbor, MI, Feb 21, 2019.
55. Department of ECE, University of Florida, Gainesville, FL, Oct 25, 2018.
56. Department of ECE, Texas A&M University, College Station, TX, Sep 21, 2017.
57. Department of ECE, Virginia Tech, Blacksburg, VA, Feb 27, 2015.
58. Department of ECE, University of Illinois–Chicago, Chicago, IL, Apr 18, 2014.
59. Department of ECE, Wayne State University, Detroit, MI, Nov 13, 2013.
60. Department of ECE, University of Illinois–Chicago, Chicago, IL, Apr 2, 2013.
61. Department of ECEE, Arizona State University, Tempe, AZ, Jan 25, 2013.
62. Department of ECE, Florida International University, Miami, FL, Apr 16, 2012.
63. Department of CSE, Michigan State University, East Lansing, MI, Nov 4, 2011.
64. School of ECE, Georgia Institute of Technology, Atlanta, GA, May 23, 2008.
65. Department of ECE, Missouri University of Science & Technology, Rolla, MO, Mar 22, 2007.
66. Department of ECE, North Carolina State University, Raleigh, NC, Mar 19, 2007.

### **Local Forums**

67. *Role of Grid-scale Storage in Michigan*. Invited talk at the *Michigan Forum on Economic Regulatory Policy*, East Lansing, MI, Feb 23, 2018.
68. *Understanding Electric Resource Adequacy*. Invited talk at the *Michigan Forum on Economic Regulatory Policy*, East Lansing, MI, Jan 30, 2015.
69. *Electric Energy Resource Outlook*. Invited talk at the *Michigan Forum on Economic Regulatory Policy*, East Lansing, MI, Feb 2, 2010.
70. *Economics and Impact of Distributed Generation*. Invited talk at the Red River Valley Section of the IEEE, Oct 2002. (Local while at NDSU)
71. *How Does Electricity Deregulation Affect Us?* Invited talk at the Rough Rider Kiwanis (Fargo Chapter of the Kiwanis International), Nov 2000. (Local while at NDSU)

### **Events Organized**

1. Organized and co-Chaired (with J. Liu) a panel on *Resilience Metrics and Modeling in Operation and Planning* at the IEEE-PES Annual General Meeting, Montreal, QB, on August 4, 2020.
2. Organized and co-Chaired (with M. Benidris) a panel on *Resilience Metrics and Evaluation Methods for Power Systems* at the IEEE-PES Annual General Meeting, Atlanta, GA, on August 7, 2019.
3. Organized and Chaired the *William Tinney Memorial Panel* (to honor William Tinney, who passed away on April 14, 2019) at the IEEE-PES Annual General Meeting, Atlanta, GA, on August 5, 2019.
4. Member, Technical Committee, 19th International Conference on Intelligent Systems Applications to Power, San Antonio, TX, Sep 17–21, 2017.
5. Organized and co-Chaired (with H. Chiang) a panel on *Application of Direct Methods in Stability Enhancement of Smart Grids* at the IEEE-PES Annual General Meeting—2016, Boston, MA, on July 21, 2016.
6. Technical Committee Program Chair for the Power System Analysis, Computing and Economics Committee at the IEEE-PES Transmission and Distribution Conference & Exposition, Dallas, TX, May 2–5, 2016.

7. Technical Committee Program Chair for the Power System Analysis, Computing and Economics Committee at the IEEE-PES Power System Conference & Exposition, Phoenix, AZ, Mar 20–23, 2011.
8. Technical Committee Program Chair for the Power System Analysis, Computing and Economics Committee at the IEEE-PES Annual General Meeting, Calgary, Alberta, July 26–30, 2009.
9. Organized and co-Chaired (with S. Suryanarayanan) a panel on *Enabling Technologies for the Customer-driven Microgrid* at the IEEE-PES Annual General Meeting—2009, Calgary, AB, on July 28, 2009.
10. Organized and Chaired the 39th Annual *North American Power Symposium*, Las Cruces, NM, September 30 to Oct 2, 2007.
11. Organized and Chaired a panel on *Power System Hardening Through Microgrids* at the IEEE-PES Annual General Meeting—2007, Tampa, FL, on June 27, 2007.
12. Organized and Chaired the IEEE Tutorial on *Electric Delivery System Reliability Evaluation* at the IEEE-PES Annual General Meeting—2006, Montreal, Quebec, on June 21, 2006.
13. Organized and Chaired the IEEE Tutorial on *Reliability of Electric Delivery Systems* at the IEEE-PES Transmission and Distribution Conference & Exposition—2006, Dallas, TX, on May 21, 2006.
14. Organized and Chaired the IEEE Tutorial on *Electric Delivery System Reliability Evaluation* at the IEEE-PES Annual General Meeting—2005, San Francisco, CA, on June 12, 2005.
15. Organized Student Programs at several IEEE-PES Conferences (2002–2008).
16. Organized the Distributed & Renewable Energy Symposium (DRES 2003) at New Mexico State University on Dec 4, 2003.

#### **Conference Sessions Chaired**

Chaired technical paper sessions and forums at the following conferences:

1. IEEE Sustainable Power & Energy Conference, Beijing, China, Nov 2019.
2. International Conference on Computing, Power and Communication Technologies, New Delhi, India, Sep 2019.
3. IEEE PowerAfrica 2018, Cape Town, South Africa, June 2018.
4. 14th International Conference on Probabilistic Methods Applied to Power Systems (PMAPS), Beijing, China, Oct 2016.
5. 12th IEEE India International Conference (INDICON), New Delhi, India, Dec 2015.
6. 13th PMAPS, Durham, UK, July 2014.
7. International Conference and Utility Exhibition on Green Energy for Sustainable Development, Pattaya City, Thailand, Mar 2014.
8. 44th North American Power Symposium (NAPS), Champaign, IL, Sep 2012.
9. 3rd International Conference on Power Systems (ICPS), Kharagpur, India, Dec 2009.
10. IEEE-PES General Meeting, Calgary, AB, July 2009.
11. 2nd ICPS, Bangalore, India, Dec 2007.
12. 5th WSEAS International Conference on Circuits, Systems, Electronics, Control & Signal Processing, Dallas, TX, Nov 2006.
13. 38th NAPS, Carbondale, IL, Sep 2006.
14. 37th NAPS, Ames, IA, October 2005.
15. 36th NAPS, Moscow, ID, Aug 2004.
16. IEEE-PES General Meeting, Denver, June 2004.
17. IEEE-PES Summer Meeting, Chicago, July 2002.

## University Service

*At Michigan State University:*

1. Member, Undergraduate Studies Committee, ECE Department, 2018–present.
2. Member, ABET Committee, ECE Department, 2013–19.
3. Area Chair, *Power, Control and Robotics Group*, ECE Department, 2016–18.
4. Member, Graduate Studies Committee, ECE Department, 2015–18.
5. Coordinator for Department Seminars, ECE Department, 2010–12.
6. Member, Graduate Admissions, Recruiting and Financial Aid Committee, ECE Department, 2008–11.

*At New Mexico State University:*

7. Chair, Ph.D. Qualifying Examination Coordination Committee, ECE Department, 2006–07.
8. Member, Graduate Studies Committee, ECE Department, 2005–08.
9. Member, Technology Committee, ECE Department, 2006–08.
10. Member, Faculty Search Committee, ECE Department, 2006–07.
11. Member, Associate Dean (Academic) Search Committee, College of Engineering, 2005.

*At North Dakota State University:*

12. Coordinator for Graduate Seminars, ECE Department, 2002–03.
13. Member, Graduate Committee, ECE Department, 2001–03.
14. Member, Curriculum Committee, ECE Department, 2000–01.

## PROFESSIONAL SOCIETY & COMMITTEE MEMBERSHIP

**Fellow, [Institute of Electrical and Electronics Engineers \(IEEE\)](#).**

- *Member, [IEEE Power and Energy Society](#)*; IEEE-PES Committee affiliations:
  - *Vice-Chair*, IEEE-PES Fellow Evaluation Committee (FEC, 2021–present; *Member*, 2020–).
  - *Chair*, PES Outstanding Young Engineer Award Committee (2021–present; *Member*, 2016–).
  - *Member and Past Chair*, PES Technical Co-sponsoring Steering Committee (*Chair*, 2014–18).
  - *Member and Past Chair*, Analytic Methods for Power Systems (AMPS) Committee (Past Chair, 2017–18; *Chair*, 2015–16; *Vice-Chair*, 2013–14; *Secretary*, 2011–12).
    - *Chair*, AMPS Awards Working Group (2019–20);
    - *Chair*, Reliability, Risk, and Probability Applications (RRPA) Subcommittee (2008–11; *Vice-Chair*, 2006–08; *Secretary*, 2002–06);
    - *Member*, Intelligent Systems Subcommittee (2007–present);
    - *Chair*, ISSC Task Force on Intelligent Control of Microgrids (2008–12);
    - *Member*, IEEE Std 762 Working Group (2016–present; 2002–06); *Secretary*, Std 762 reaffirmation WG (2011);
    - *Member*, IEEE Std 859 reaffirmation WG (2007).
  - *Member*, IEEE-PES Power Systems Education Committee (PEEC).
    - *Chair*, Research Subcommittee (2015–17; *Vice-Chair*, 2013–15; *Secretary*, 2011–13);
    - *Chair*, Student Activities Subcommittee (2005–07; *Vice-Chair*, 2003–05; *Secretary*, 2001–03).
  - *Secretary*, PES Technical Council Operations & Procedures Committee (2012–14).
  - *Member*, PES Technical Council Awards Committee (2019–20).
- *Member, [IEEE Industry Applications Society](#)*.
- *Member, [IEEE Standards Association](#)*.

**Member**, Board of Directors of the Intelligent System Applications to Power Systems (ISAP) Conference (2017–present).

**Faculty Affiliate, [Environmental Science and Policy Program](#)**, Michigan State University, (2016–present).

**Senior Faculty Associate, [Institute of Public Utilities](#)**, Michigan State University, (2009–present).

**Member, [Center for Stochastic Modeling](#)**, New Mexico State University (2004–08).

## HONORS & AWARDS

### Honors

- **Fellow, IEEE**, for contributions to the development of power system reliability methods, 2019.
- **IEEE-PES Distinguished Lecturer**.
- **Senior Member, IEEE**, 2002.
- **Fellow of the Faculty Institute of Excellence in Learning** (North Dakota State University), 2002.

### Awards

- PMAPS Merit Award, 2020  
(from the International Society for Probabilistic Methods Applied to Power Systems).
- IEEE Power & Energy Society (PES) Roy Billinton Power System Reliability Award, 2019.
- IEEE-PES Technical Committee Prize Paper Award, August 2019, for journal article [25].
- IEEE-PES Technical Committee Prize Paper Award, July 2016, for journal article [37].
- IEEE-PES Technical Committee Distinguished Service Award for service to the Power System Analysis, Computing and Economics (PSACE) Committee, in July 2012.
- IEEE-PES Technical Committee Working Group Recognition Award (as *Chair* of the Electric Delivery System Reliability Tutorial Working Group), in June 2007.
- Supervisor of First prize winner in Student Poster Contest at the IEEE Power Systems Conference & Exposition 2006, Atlanta, GA, October 2006.
- IEEE-PES Technical Committee Working Group Recognition Award (as member of the IEEE Standard 762 Working Group), in August 2005.
- IEEE-PES Technical Committee Working Group Recognition Award (as member of the Power Engineering Education Committee's Student Meeting Subcommittee), in August 2003.
- The **NSF Career Award**, 2002.
- The 1994–95 Outstanding Assistant Lecturer Award  
(Department of Electrical Engineering, Texas A&M University), April 1995.
- The **Jagadis Bose National Science Talent Search Scholarship** (India), July 1985 to June 1989.

## RESEARCH AND EDUCATION GRANTS

### Research Grants and Contracts

1. PI, "Models for Evaluation and Optimization of Grid-Scale Energy Storage," US Department of Energy/Sandia National Laboratories, \$315,000; 2018–21.
2. PI (with M. Thomas), "Application of Utility-Scale Battery Storage in Power Distribution System," Consumers Energy Corporation, \$346,000; 2016–19.
3. PI, "Impacts of Power Flow Control in Distribution Systems," Michigan Economic Development Corporation, \$40,000; 2017.
4. PI, "A Lyapunov Function Based Remedial Action Screening Tool Using Real-Time Data," US Department of Energy, \$1,875,000; 2012–15.
5. PI (with M. Thomas), "Impact of Increased Renewable Generation Resources Across the MISO Zone 7 Footprint," Consumers Energy Corporation, \$142,000; 2014–15.
6. Co-PI (with F. Z. Peng), "Transformer-less Unified Power Flow Controller for Wind and Solar Power Transmission," ARPA-E, \$2,520,000; 2012–15.
7. PI, "Optimal Fuel-Switching in CoGen Plant to Meet Environmental and Operational Constraints," MSU Office of Campus Sustainability, \$30,000; 2010–11.
8. Co-PI (with S. J. Ranade, S. Suryanarayanan, P. Ribeiro), "A Holistic Approach to Customer-driven Microgrids," National Science Foundation Grant ECCS-0702208, \$450,000; 2007–10 (extended at no cost to 2011).

9. PI, NSF Career Grant ECS-0134598, \$375,000; 2002–07 (extended at no cost to 2008).
10. PI, SURP Grant, Sandia National Laboratories, \$40,000; 2006–07.
11. PI, SURP Grant, Sandia National Laboratories, \$40,000; 2005–06.
12. PI (with Don L. Stuehm), “Advanced Transformer Modeling for Transients Simulation,” Bonneville Power Administration, \$60,000; 2002–03.
13. PI (with Don L. Stuehm), “A Real Time Price Signal Driven Demand Management System,” Otter Tail Power Company, \$60,000; 2001–03.
14. PI (with Don L. Stuehm), “Dynamic Modeling of Large Induction Motors for Stability and Load Flow Studies,” Otter Tail Power Company, \$15,000; 2001–02.
15. Co-PI (with Don L. Stuehm), “Dynamic Ratings of Transmission Lines, Transformers, Traps and Current Transformers,” Otter Tail Power Company, \$15,000; 2001–02.

#### **Education and Outreach Grants**

16. PI, “A Nationwide Consortium of Universities to Revitalize Electric Power,” subcontract from University of Minnesota (US Department of Energy grant), \$4,000; 2010–13.
17. PI (with S. Ranade), “Student Support for 2007 North American Power Symposium,” NSF, \$10,000; 2007.

#### **PATENTS**

1. “Linear Optimal Power Flow System and Method,” U.S. Patent No. 10,296,988, issued May 21, 2019.
2. “Tool Employing Homotopy-Based Approaches in Finding the Controlling Unstable Equilibrium Point in the Electric Power Grid,” with N. Cai and M. Benidris. U.S. Patent No. 10,097,000, issued Oct 9, 2018.
3. “Standby Generator Integration System,” with J. A. Jorgenson, D. L. Stuehm and T. Shaner. U.S. Patent No. 7,180,210, issued Feb 20, 2007.

#### **TECHNICAL PUBLICATIONS**

##### **Ph.D. Dissertation**

“Models for Reliability Evaluation of Multi-Area and Composite Systems,” published by *ProQuest Information and Learning*, Ann Arbor, MI; 1997.

##### **Books**

- [1] “Electric Power Grid Reliability Evaluation: Models and Methods,” with C. Singh and P. Jirutitijaroen, Wiley-IEEE Press, Hoboken, NJ; 2019. ISBN: 9781119486275.
- [2] IEEE Std. 762 Working Group, “IEEE Std. 762-2006: IEEE Standard Definitions for Use in Reporting Electric Generating Unit Reliability, Availability and Productivity.” IEEE, Piscataway, NJ; 2006. (Co-author.)
- [3] “IEEE Tutorial on Electric Delivery System Reliability Evaluation.” IEEE, Piscataway, NJ; 2005. Publication number 05TP175. (Editor: J. Mitra.)

##### **Book Chapters**

- [1] “Emergency Power Supply for Load Point Reliability,” with C. Singh, in *Wiley Encyclopedia of Electrical and Electronics Engineering*. Wiley, New York, NY; Aug 2017.
- [2] “Dynamic Contingency Analysis and Remedial Action Tools for Secure Electric Cyber-Physical Systems,” with M. Benidris and N. Nguyen, in *Cyber-Physical-Social Systems and Constructs in Electric Power Engineering* (Editors: S. Suryanarayanan, R. Roche and T. Hansen), IET, London, UK; 2016.
- [3] “Reliability Evaluation in Transmission Systems,” with C. Singh, in *Smart Grid Handbook* (Editors: C.-C. Liu, S. McArthur and S.-J. Lee), Wiley, New York, NY; 2016.
- [4] “Applications of Particle Swarm Optimization in Composite Power System Reliability Evaluation,” with M. Benidris and S. A. Elsaiah, in *Handbook of Research on Swarm Intelligence in Engineering* (Editors: S. Bhattacharyya and P. Dutta), pp 573–610, IGI Global, Hershey, PA; 2015.

- [5] "Reliability-Constrained Optimal Distribution System Reconfiguration," with S. A. Elsaiah and M. Benidris, in *Computational Intelligence Applications in Modeling and Control* (Editors: A. T. Azar and S. Vaidyanathan), pp 265–289, Springer International Publishing, Switzerland; 2015.
- [6] "Monte Carlo Simulation and Intelligent Search Methods," with C. Singh, in *IEEE Tutorial on Electric Delivery System Reliability Evaluation* (Editor: J. Mitra), pp 23–38. IEEE, Piscataway, NJ; 2005.
- [7] "Emergency Power Supply," with C. Singh, in *Wiley Encyclopedia of Electrical and Electronics Engineering* (Editor: J. G. Webster), vol 7, pp 61–67. Wiley, New York, NY; 1999.

#### **Refereed Journal Papers**

- [1] "Distributed Energy Resources based Microgrid: Review of Architecture, Control, and Reliability," with A. Muhtadi, D. Pandit and N. Nguyen, to appear in *IEEE Transactions on Industry Applications*, 57(3); May/June 2021. (on ieeexplore; doi: 10.1109/TIA.2021.3065329)
- [2] "Maximizing the Investment Returns of a Grid-connected Battery considering Degradation Cost," with A. Bera, S. Almasabi, Y. Tian, R. H. Byrne, B. Chalamala and T. A. Nguyen, *IET Generation, Transmission and Distribution*, 14(21): 4711–4718; Nov 2020.
- [3] "Use of Performance Indices for Contingency Screening for Rapid Assessment of Dynamic Security Region," with T. A. Simões and C. L. T. Borges, *IET Generation, Transmission and Distribution*, 14(18): 3896–3904; Sep 2020.
- [4] "PV Hosting Capacity of LV Distribution Networks using Smart Inverters and Storage Systems: A Practical Margin," with J. F. B. Sousa and C. L. T. Borges, *IET Renewable Power Generation*, 14(8): 1332–1339; June 2020.
- [5] "A Homotopy-based Method for Robust Computation of Controlling Unstable Equilibrium Points," with M. Benidris, *IEEE Transactions on Power Systems*, 35(2): 1422–1431; Mar 2020.
- [6] "Reduction of Three-Phase Transformer Inrush Currents Using Controlled Switching," with X. Xu and M. Benidris, *IEEE Transactions on Industry Applications*, 56(1): 890–897; Jan/Feb 2020.
- [7] "Optimal Power Flow Incorporating Frequency Security Constraint," with N. Nguyen, S. Almasabi and A. Bera, *IEEE Transactions on Industry Applications*, 55(6): 6508–6516; Nov/Dec 2019.
- [8] "A Fault-Tolerance Based Approach to Optimal PMU Placement," with S. Almasabi, *IEEE Transactions on Smart Grid*, 10(6): 6070–6079; Nov 2019.
- [9] "Impact of Correlation Between Wind Speed and Turbine Availability on Wind Farm Reliability," with N. Nguyen and S. Almasabi, *IEEE Transactions on Industry Applications*, 55(3): 2392–2400; May/June 2019.
- [10] "Nonparametric Statistics-based Predictor Enabling Online Transient Stability Assessment," with T. Liu, Y. Liu, L. Xu, J. Liu, and Y. Tian, *IET Generation, Transmission and Distribution*, 12(21): 5761–5769; Dec 2018.
- [11] "Multi-Stage Optimal PMU Placement Considering Substation Infrastructure," with S. Almasabi, *IEEE Transactions on Industry Applications*, 54(6): 6519–6528; Nov/Dec 2018.
- [12] "Energy Storage to Improve Reliability of Wind Integrated Systems under Frequency Security Constraint," with N. Nguyen and A. Bera, *IEEE Transactions on Industry Applications*, 54(5): 4039–4047; Sep/Oct 2018.
- [13] "Stacked Revenue and Technical Benefits of a Grid-connected Energy Storage System," with Y. Tian, A. Bera and M. Benidris, *IEEE Transactions on Industry Applications*, 54(4): 3034–3043; Jul/Aug 2018.
- [14] "Reliability of Power System with High Wind Penetration under Frequency Stability Constraint," with N. Nguyen, *IEEE Transactions on Power Systems*, 33(1): 985–994; Jan 2018.
- [15] "Integrated Evaluation of Reliability and Stability of Power Systems," with M. Benidris and C. Singh, *IEEE Transactions on Power Systems*, 32(5): 4131–4139; Sep 2017.
- [16] "A Visualization Tool for Real-Time Dynamic Contingency Screening and Remedial Actions," with M. Benidris, N. Nguyen and S. Deb, *IEEE Transactions on Industry Applications*, 53(4): 3268–3278; July/Aug 2017.

- [17] "Quantification of Storage Necessary to Firm Up Wind Generation," with S. Sulaeman, Y. Tian and M. Benidris, *IEEE Transactions on Industry Applications*, 53(4): 3228–3236; July/Aug 2017.
- [18] "Predictive Analysis of Microgrid Reliability Using a Probabilistic Model of Protection System Operation," with X. Xu, T. Wang and L. Mu, *IEEE Transactions on Power Systems*, 32(4): 3176–3184; July 2017.
- [19] "A Wind Farm Reliability Model Considering Both Wind Variability and Turbine Forced Outages," with S. Sulaeman, M. Benidris and C. Singh, *IEEE Transactions on Sustainable Energy*, 8(2): 629–637; Apr 2017.
- [20] "Research on Common-Mode and Dependent (CMD) Outage Events in Power Systems—A Review," with M. Papic, et al., *IEEE Transactions on Power Systems*, 32(2): 1528–1536; Mar 2017.
- [21] "An Evaluation Strategy for Microgrid Reliability Considering the Effects of Protection System," with X. Xu, T. Wang and L. Mu, *IEEE Transactions on Power Delivery*, 31(5): 1989–1997; Oct 2016.
- [22] "An Emission-Constrained Approach to Power System Expansion Planning," with M. Benidris and S. Elsaiah, *International Journal of Electrical Power and Energy Systems*, 81: 78–86; Oct 2016.
- [23] "A New Method for Estimating the Longevity and Degradation of Photovoltaic Systems Considering Weather States," with A. Ahadi, H. Hayati, R. Abbasi-Asl and K. Awodele, *Frontiers in Energy*, 10(3): 277–285; Sep 2016.
- [24] "Optimal Deployment of Distributed Generation Using a Reliability Criterion," with M. R. Vallem and C. Singh, *IEEE Transactions on Industry Applications*, 52(3): 1989–1997; May/June 2016.
- [25] "An Analysis of the Effects and Dependency of Wind Power Penetration on System Frequency Regulation," with N. Nguyen, *IEEE Transactions on Sustainable Energy*, 7(1): 354–363; Jan 2016.
- [26] "Reliability Evaluation of a Microgrid Considering Its Operating Condition," with X. Xu, T. Wang and L. Mu, *Journal of Electrical Engineering and Technology*, 11(1): 47–54; Jan 2016.
- [27] "Power System Reliability Evaluation Using a State Space Classification Technique and Particle Swarm Optimization Search Method," with M. Benidris and S. Elsaiah, *IET Generation, Transmission and Distribution*, 9(14): 1865–1873; Nov 2015.
- [28] "Reliability and Sensitivity Analysis of Composite Power Systems Considering Voltage and Reactive Power Constraints," with M. Benidris, *IET Generation, Transmission and Distribution*, 9(12): 1245–1253; Sep 2015.
- [29] "Microgrid Protection Using System Observer and Minimum Measurement Set," with M. Esreraig, *International Transactions on Electrical Energy Systems*, 25(4): 607–622; Apr 2015.
- [30] "Fast Economic Power Dispatch Method for Power System Planning Studies," with S. Elsaiah, N. Cai and M. Benidris, *IET Generation, Transmission and Distribution*, 9(2): 417–426; Apr 2015.
- [31] "Evaluation of Operational Reliability of a Microgrid Using a Short-Term Outage Model," with X. Xu, T. Wang and L. Mu, *IEEE Transactions on Power Systems*, 29(5): 2238–2247; Sep 2014.
- [32] "Planning of Reliable Microgrids in the Presence of Random and Catastrophic Events," with X. Xu, N. Cai and L. Mou, *International Transactions on Electrical Energy Systems*, 24(8): 1151–1167; Aug 2014.
- [33] "Analytical Approach for Placement and Sizing of Distributed Generators on Power Distribution Systems," with S. Elsaiah and M. Benidris, *IET Generation, Transmission and Distribution*, 8(6): 1039–1049; Jun 2014.
- [34] "A Multi-Level Control Architecture for Master-Slave Organized Microgrids with Power Electronic Interfaces," with N. Cai, *Electric Power System Research*, 109: 8–19; Apr 2014.
- [35] "Reliability and Sensitivity Analysis of Composite Power Systems Under Emission Constraints," with M. Benidris, *IEEE Transactions on Power Systems*, 29(1): 404–412; Jan 2014.
- [36] "A Review of Voltage Dip Mitigation Techniques with Distributed Generation in Electricity Networks," with O. Ipinnimo, S. Chowdhury and S. P. Chowdhury, *Electric Power System Research*, 103: 28–36; Oct 2013.

- [37] "Determination of Storage Required to Meet Reliability Guarantees on Island-Capable Microgrids with Intermittent Sources," with M. R. Vallem, *IEEE Transactions on Power Systems*, 27(4): 2360–2367; Nov 2012.
- [38] "Web Based Online Real-time Information System for Reliability of Electrical Energy Supply Including WTG," with J. Choi, J. Park, T. Oh, K. Cho and M. Shahidehpour, *Journal of International Council on Electrical Engineering*, 1(3): 281–287; July 2011.
- [39] "Microgrid Protection Using Communication-Assisted Digital Relays," with E. Sortomme and S. S. Venkata, *IEEE Transactions on Power Delivery*, 25(4): 2789–2796; Oct 2010.
- [40] "Reliability-based Sizing of Backup Storage," *IEEE Transactions on Power Systems*, 25(2): 1198–1199; May 2010.
- [41] "Distribution System Reliability Evaluation Using Credibility Theory," with X. Xu, *International Journal of Engineering, Science and Technology*, 2(3): 107–118; May 2010.
- [42] "A Direct Method for Determination of Failure Frequency Indices Using State Space Decomposition," with C. Singh, *WSEAS Transactions on Systems*, 6(2): 243–250; Feb 2007.
- [43] "Hybrid Transformer Model for Transient Simulation: Part I—Development and Parameters," with B. A. Mork, F. Gonzalez, D. Ischenko and D. L. Stuehm, *IEEE Transactions on Power Delivery*, 22(1): 248–255; Jan 2007.
- [44] "Hybrid Transformer Model for Transient Simulation: Part II—Laboratory Measurements and Benchmarking," with B. A. Mork, F. Gonzalez, D. Ischenko and D. L. Stuehm, *IEEE Transactions on Power Delivery*, 22(1): 256–262; Jan 2007.
- [45] "Reliability-Specified Generation and Distribution Expansion in Microgrid Architectures," with S. B. Patra, S. J. Ranade and M. R. Vallem, *WSEAS Transactions on Power Systems*, 1(8): 1446–1453; Aug 2006.
- [46] "Pruning and Simulation for Determination of Frequency and Duration Indices of Composite Systems," with C. Singh, *IEEE Transactions on Power Systems*, 14(3): 899–905; Aug 1999.
- [47] "Capacity Assistance Distributions for Arbitrarily Configured Multi-Area Networks," with C. Singh, *IEEE Transactions on Power Systems*, 12(4): 1530–1535; Nov 1997.
- [48] "Composite System Reliability Evaluation using State Space Pruning," with C. Singh, *IEEE Transactions on Power Systems*, 12(1): 471–479; Feb 1997.
- [49] "Reliability Analysis of Emergency and Standby Power Systems," with C. Singh, *IEEE Industry Applications Society Magazine*, 3(5): 41–47; Sep/Oct 1997.
- [50] "Incorporating the DC Load Flow Model in the Decomposition-Simulation Method of Multi-area Reliability Evaluation," with C. Singh, *IEEE Transactions on Power Systems*, 11(3): 1245–1254; Aug 1996.
- [51] "New Architectures for Space Power Systems," with M. Ehsani, M. O. Bilgic and A. D. Patton, *IEEE Aerospace and Electronic Systems Magazine*, 10(8): 3–8; Aug 1995.
- [52] "Magnetically Inflatable SPS with Energy Storage Capability," with M. Ehsani, M. O. Bilgic and A. D. Patton, *IEEE Aerospace and Electronic Systems Magazine*, 10(8): 9–14; Aug 1995.

#### **Conference Proceedings Papers**

- [1] "Optimal Planning of Energy Storage in Wind Integrated Systems considering Frequency Stability," with A. Bera, B. Chalamala and R. H. Byrne, to be presented at the *IEEE-PES Annual General Meeting*, Washington, DC, July 25–29, 2021. (*accepted*)
- [2] "Single-phase and Three-phase Reactive Power Support for Microgrids from Grid-connected Electric Vehicles," with K. Sinjari and J. Kim, *Proceedings of the 52nd Annual North American Power Symposium*, Tempe, AZ, Apr 11–13, 2021.
- [3] "Reliability Improvement of Wind Integrated Power Systems using Energy Storage and Aggregation," with A. Bera and N. Nguyen, *Proceedings of the 55th IEEE-IAS Annual Meeting*, Detroit, MI, Oct 11–15, 2020.

- [4] "A Direct Method to Calculate Capacity Value of Variable Energy Resources," with M. Benidris and S. Sulaeman, *Proceedings of the 55th IEEE-IAS Annual Meeting*, Detroit, MI, Oct 11–15, 2020.
- [5] "Renewable Energy based Microgrid: Role of the Architecture in Grid Enhancement towards Sustainable Energy," with A. Muhtadi, D. Pandit and N. Nguyen, *Proceedings of the 55th IEEE-IAS Annual Meeting*, Detroit, MI, Oct 11–15, 2020.
- [6] "Electric Vehicle Charging with Reactive Power Compensation to Distribution Systems," with K. Sinjari, *Proceedings of the 55th IEEE-IAS Annual Meeting*, Detroit, MI, Oct 11–15, 2020.
- [7] "Variability Reduction of Wind Power using Aggregation and Energy Storage," with A. Bera, N. Nguyen, S. Alzahrani and K. Sinjari, *Proceedings of the 16th International Conference on Probabilistic Methods Applied to Power Systems*, Liege, Belgium, Aug 18–21, 2020.
- [8] "A Sensitivity-based Approach for Optimal Siting of Distributed Energy Resources," with M. Gautam, N. Bhusal, M. Benidris and C. Singh, *Proceedings of the 16th International Conference on Probabilistic Methods Applied to Power Systems*, Liege, Belgium, Aug 18–21, 2020.
- [9] "Data-driven Assessment of Power System Reliability in Presence of Renewable Energy," with A. Bera, A. Chowdhury, S. Almasabi and M. Benidris, *Proceedings of the 16th International Conference on Probabilistic Methods Applied to Power Systems*, Liege, Belgium, Aug 18–21, 2020.
- [10] "Sizing of Energy Storage Systems for Grid Inertial Response," with A. Bera, M. Abdelmalak, S. Alzahrani and M. Benidris, *Proceedings of the IEEE-PES Annual General Meeting*, Montreal, Quebec, Aug 2–6, 2020.
- [11] "Sensitivity Analysis of Power System Reliability Indices Including Voltage and Reactive Power Constraints," with S. Elsaiah and M. Benidris, *Proceedings of the IEEE-PES Annual General Meeting*, Montreal, Quebec, Aug 2–6, 2020.
- [12] "Sustainable Off-Grid Electricity Generation System for Low Power Lighting in Remote Locations," with B. B. Shenoy, U. S. Acharya and Tonse Laxminidhi, *Proceedings of the 2020 IEEE Kansas Power & Energy Conference*, Manhattan, KS, July 13–14, 2020.
- [13] "Capacity Credit Evaluation of Wind Farm Considering Impact of Turbine Hub Level," with N. Nguyen and S. Almasabi, *Proceedings of the 51st Annual North American Power Symposium*, Wichita, KS, Oct 13–15, 2019.
- [14] "Lifetime Revenue from Energy Storage considering Battery Degradation," with A. Bera and N. Nguyen, *Proceedings of the 51st Annual North American Power Symposium*, Wichita, KS, Oct 13–15, 2019.
- [15] "Spatiotemporal Optimization of Grid-Connected Energy Storage to Maximize Economic Benefits," with A. Bera and S. Almasabi, *Proceedings of the 54th IEEE-IAS Annual Meeting*, Baltimore, MD, Sep 29–Oct 3, 2019.
- [16] "A Reliability-Transient Stability Analysis of Power Systems for Protection System Conditions," with A. Koksai and A. Ozdemir, *Proceedings of the 6th International Conference on Modern Electric Power Systems*, Wroclaw, Poland, Sep 9–12, 2019.
- [17] "Dynamic State Estimation Aided by Machine Learning," with S. Almasabi and A. Bera, *Proceedings of the IEEE-PES Annual General Meeting*, Atlanta, GA, Aug 4–8, 2019.
- [18] "Modeling of Battery Energy Storage Systems for System Reliability Studies," with A. Bera, S. Almasabi and C. L. T. Borges, *Proceedings of the IEEE-PES Annual General Meeting*, Atlanta, GA, Aug 4–8, 2019.
- [19] "Human Muscle Energy Harvesting: Models and Application for Low Power Loads," with B. B. Shenoy, T. Laxminidhi and U. S. Acharya, *Proceedings of the 8th IEEE India International Conference on Power Electronics*, Jaipur, India, Dec 13–15, 2018.
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- [7] "Optimal Fuel-Switching in MSU CoGen Plant to Meet Environmental and Operational Constraints," with X. Xu, report submitted to Michigan State University Office of Campus Sustainability, Mar 2012.
- [8] "A Holistic Approach to Customer-Driven Microgrids," with S. J. Ranade and S. Suryanarayanan, final report submitted to the National Science Foundation, Aug 2011.
- [9] "Reliability-driven Microgrid Architecture," final report submitted to the National Science Foundation, Nov 2008.
- [10] "Optimal Resource Deployment in a Surety Microgrid," a report submitted to the Sandia National Laboratories, Oct 2007.
- [11] "Storage Optimization in a Surety Microgrid," a report submitted to the Sandia National Laboratories, Oct 2006.
- [12] "Advanced Transformer Modeling for Transients Simulation." Project report submitted to the Bonneville Power Administration, Sep 2003.
- [13] "Dynamic Rating of Transmission Lines, Transformers, Traps and Current Transformers," with D. L. Stuehm, a report submitted to the Otter Tail Power Company, Jun 2002.
- [14] "Tools and Data for the Analysis of the Impact of the California Power Exchange and the Independent System Operator on the California and Regional Power Market," with R. Albert, a report submitted to the Sacramento Municipal Utility District, Oct 1997.

## **A.6 - Dr. Pawel Gepner**

**Paweł Kazimierz Gepner**  
+48506789514 [pawel.gepner@gmail.com](mailto:pawel.gepner@gmail.com)

*I am the world class expert of HPC architecture with 20 years of industry experience and notable scientific achievements*

## **Professional Experience**

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**2021 –      *Graphcore Ltd***

**2021-      : Senior Hardware & Systems Field Application Engineer.**

***Responsibilities:***

- Own the technical relationships with our customers and partners and help them to exploit Graphcore's IPU technology to achieve breakthroughs in artificial intelligence
- Assist customers with integration of Graphcore's product into their hardware infrastructures
- Technical expert on Graphcore's products, directly supporting sales teams to secure design wins, and to lead hardware and software support of Graphcore's products from the design-in phase through to successful completion and production deployment
- Expert on Graphcore's IPU technology and Poplar™ tools and deliver compelling training to customers and partners
- Shepherd critical customer issues and provide timely advance warning of critical issues that need attention
- Work closely with the Product Management and Engineering to ensure a good flow of customer and market feedback that can be incorporated into future product

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**1996 – 2020      *Intel Corporation – EMEA Technical Group***

**2015- 2020: Senior Field Application Engineer for Atos.**

***Responsibilities:***

- Drive global technical relationship between Atos and Intel,
- Managing technical enablement (technical marketing discussion with the planers and platform owners), design guidelines delivery and enabling to

R&D, validation plans coordination

- Synchronize and include complete Intel Roadmap: processors, platforms, fabric, and software into customer's portfolio.
- Close cooperation with Atos R&D on feasibility study, architecture and design concept ended with development of the unique and innovative platforms and products.
- Hold Intel representation in Atos Sequana HPC platform development team – the flagship platform of Atos HPC solutions and foundation of all biggest Atos HPC installations.
- Development support for Atos SMP system involving transfer Intel's IP to Atos for their symmetrical controller switch – this is scale-up class of system capable to grow to 32 processor and one of the most flexible SMP platform on the market.
- Coordinated and helped Atos with certification process for SAP Hana, this task required synchronization of Atos, Intel and SAP teams located in 3 different geos - finally this project was a key element in Atos IBM-Power modernization and became a strategy and key differentiator for their customers.
- Driven the IoT Edge server project from concept to implementation, enabled Xeon-D based platform as the foundation of Atos IoT class of appliances. I was also member of the team that planned next generation Fabrics development - BXI and used joint efforts to bring this plan to fruition.

## **2007- 2015: Technical Account Manager – Bull and Cray.**

### ***Responsibilities:***

- Member of development team responsible for enablement and bringing to the global market the platforms, technologies and HPC installations based on several generations of Intel processors including Intel Xeon and Xeon -Phi family products.
- Lead customer's architecture and engineering teams to help solve the issues arose within some projects (Meteo France, CEA or Airbus) to drive them to critical success factors. This required collaboration with customer's R&D, pre-sales and appropriate Intel divisions. Great relationship management skills and senior stakeholder management experiences was one of the key success factor.
- Major stakeholder in Bull and Cray extrapolation of technology trends workshops, aimed to design leading-edge HPC platforms. I participated in document system design specifications and functional specifications

for these platforms. As the results many of developed platforms have been used to build the largest HPC installations in Europe and have been listed on Top500 list of biggest supercomputers in the world.

**2002-2007: EMEA HPC Platform Architecture Specialist.** Member of the global HPC team focused on analyzing, planning and architecting next generation technology and products (software and hardware) specialized for HPC.

***Responsibilities:***

- Provide customers and end-users feedback and recommend technological solutions that facilitate client objectives, profitability and analyzing market trends.
- Provide critical view into “real world” that is used to improve products and processes for Intel HPC dedicated products.
- Coordinated and managed implementation of Intel's OEMs projects into key HPC supercomputing centers: HLRN, CEA, AWE, Cyfronet, BMW, CERN.
- Working with Intel Software Solution Group to make sure that products were optimized and suitable for parallel and distributed computing.
- I developed the algorithm for the *dense small matrix multiplications* which was implemented, and it is still today a part of Intel Math Kernel Library – (*Gepner-Gamayunov algorithm*).

**1999-2002: EMEA Regional Architecture Specialist.**

***Responsibilities:***

- Influence and development of the most important HPC projects in the EMEA territory. It includes first Teraflops computing projects in EMEA – CEA and first Itanium 2 Teraflops installations at TASK.
- Managing HPC projects which ended with successful systems implementations at: BMW, TASK, SKODA, VW, Audi, CERN, Airbus, ICM. Provided technical and architectural perspective by working on customer issues, delivered strategic guidance, keeping the close cooperation with intel HPC team to meet the goals and objectives.

**1998-1999: Field Application Engineer for LOEMs.**

***Responsibilities:***

- Planned and implemented best practices for OEMs to monitor support traffic for best customer support.
- Trained new staff members to bring them quickly and effectively

up to speed and help contribute to the team and organization.

- Led many of innovative server development projects:
  - *first Fault Tolerance Systems based on IA-32* delivered by Stratus Technology,
  - development of the *densest Pentium III server* platform designed at IBM EMEA Development Center in Greenock,
- Managed the team of Intel architects that help in development of *Bull's Itanium 2 system* as the alternative system for mainframe solutions.
- Leading a project of Itanium 2 real time operating systems for Siemens AG and Eriksson.

**1996-1998: Software Engineer for MMX Applications in CEE Region:**

member of the engineering team which was supporting software companies working and bringing to the market 20 new optimized applications utilizing Intel MMX instructions extension.

***Responsibilities:***

- Managing and solving escalated technical problems,
- Close cooperation and task management with customers' Product Development, Product Management, and Intel software engineering teams providing technical assistance to developers. It was the first project when Intel was working with software ecosystem vendors and helping them in development and optimization of their applications.

## **Education**

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Habilitation (Associate Professor degree). The Central Commission for Academic Degrees and Titles Polish Academy of Sciences. Dissertation title: ***Architecture, building and utilization of High-Performance Computing Systems.***

PhD in Computer Science. Warsaw University of Technology. Thesis title: ***Methodology of building Internet based IT systems for digital retail (E-Commerce).***

Master of Engineering in Applied Computing. Warsaw University of Technology. Faculty of Technical Physics and Applied Mathematics. Thesis title: ***Security methods for relational databases.***

## Qualifications and Additional Skills

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- For almost 20 years I was *official EMEA technical Intel spokesperson* responsible for communication with the technical press, specially trained and certified by Intel global PR division.
- Expert knowledge of HPC/AI computer system architecture with hands on experience of architecting and designing modern HPC/AI solutions.
- Deep understanding of HPC/AI market trends, typical characteristics and corresponding solution architectures.
- Familiar with main methods for HPC/AI applications, such as *Monte Carlo, FEM, CNN/DNN, etc.*
- Excellent analytical & problem-solving skills combined with the ability to provide quick resolution to problems and drive designs successfully.
- Ability to professional steer and contribute quality designs and code on multiple levels of the platform and complicated multifaceted projects.
- Experience to work in a highly ambiguous multi-culture and multi-language environment and to achieve high quality results.
- Able to understand, articulate, manage and respond to customer's detailed technical issues in a timely and concise fashion,
- Has keen analytical skills, attention to detail and ability to work independently – 15 years of home base office experience, strong multitasking abilities, quick decision-making skills.
- Demonstrated ability to professionally handle difficult customer situation.
- Authored and published 60+ scientific papers in the field of HPC/AI and Computer Science indexed by: *Web of Science; DBLP-Computer Science Bibliography* and *Google Scholar*.
- Scientific comity member for many of conferences and journals: *Parallel Processing and Applied Mathematics Conference, International Conference of Computational Science, Computer Aspects of Numerical Algorithms Journal, Conference on Computer Science and Information Systems, International Symposium of Parallel and Distributed Computing.*
- fluent: *English; Polish; Russian* and have basic understanding of *German*.

## Hobbies

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I am a judo trainer as well as a professional horse-riding instructor. I am a military history enthusiast.

## **A.7 - Prof. Jari Collin**

# Jari Collin



## Personal

nationality	<b>Finnish</b>
date of birth	<b>27 Apr 1972</b>
marital status	<b>Married, four children</b>
address	<b>Koukkuniementie 12E, 02230 Espoo, Finland</b>
telephone (mobile)	<b>+358 50 583 1298</b>
email (home)	<b>jari.collin@aalto.fi</b>
languages spoken	<b>Finnish - native like, English - fluent, Swedish - intermediate, German - intermediate, French - basic knowledge</b>

## Education & Qualifications

<b>2013</b>	<b>Aalto University</b> Adjunct Professor, Enterprise Information Systems and Service Networks
<b>2003</b>	<b>Helsinki University of Technology</b> Ph.D. (Tech), Industrial Management
<b>1996</b>	<b>Tampere University of Technology</b> M.Sc. (Tech), Industrial Management

## Career Summary

<b>2016 –</b>	<b>CTO at Telia Finland Oy</b>
<b>2014 – 2016</b>	<b>CIO at Efora Oy</b>
<b>2008 – 2014</b>	<b>CIO at Elisa Oy</b>
<b>1994 - 2008</b>	<b>Several positions at Nokia Oy</b>

# Professional Experience

**2016 –**

## **Telia Finland Oy (ex Sonera)**

Chief Technology Officer, Head of Infrastructure unit

Task information:

- Country CTO is responsible for telecom networks, sites, data centres, real estates, security, and the local wholesale business. Earlier, the role covered full responsibility of IT and product management functions that were centralized to Telia Group in 2020. Now the reporting it dotted line to Telia country.

**2014 - 2016**

## **Efora Oy**

Chief Information Officer

Company information:

- Efora is a subsidiary of Stora Enso group, specialized in industrial maintenance and engineering services. The company provides on-going maintenance contracts, engineering services and specialist services, such as roll and pump maintenance.
- Efora manages the life cycle of Stora Enso's industrial production lines, maximise production capacity and ensure trouble-free operation through smarter maintenance solutions.
- It employs approximately 850 professionals in Heinola, Helsinki, Imatra, Kemi, Oulu, Uimaharju and Varkaus mills.
- The company's turnover around EUR 200 million.

Task information:

- CIO, full member of the company's leadership team. An active member of Stora Enso's extended IT leadership team.
- First task was to help in creating new 'Smart Maintenance' -strategy for the company and to prepare a roadmap for the industrial internet implementation. The strategic intent is to provide industrial competitiveness through smart maintenance by better utilizing new technologies and digitalization.
- In addition to traditional IT services, is responsible for leading Smart Maintenance –strategy change projects and strengthening capabilities in information management.

**2008 - 2014**

## **Elisa Oy**

Chief Information Officer

Task information:

- The role as a chief information officer at Elisa was two-fold. First, the CIO was responsible for driving corporate IT strategy and leading the development, maintenance, and operations of all internal IT services –aligned with Elisa business processes. The

second major task is to drive technology innovations and to support businesses in creating and delivering new online services for Elisa's customers.

**2007 - 2008**

**Nokia Siemens Networks**

Head of Processes and IT Consolidation

Task information:

- The head of NSN Processes and IT Consolidation was a direct continuation of NSN IT integration. Target was to provide NSN global, consolidated processes and IT platforms to gain short-term merger benefits. Main focus was to ensure seamless integration of Quote-to-Cash related processes and information systems of Nokia Networks and Siemens Communications. The scope covered the development and implementation of most all critical IT systems, including PDM, CRM, SAP R/3, and Demand-Supply Planning systems.
- The role reported the progress to a separate NSN Integration Board headed by the CEO.
- The location was split between Helsinki and München.

**1994 - 2007**

**Nokia Networks**

2006 - 2007

Head of ICT / CIO

Task information:

- The role was established to prepare and implement IT changes for the NSN integration from Nokia side. Similarly, Siemens appointed "Siemens Communications CIO" with whom the NSN IT integration as well as IT carve-out from the two parent companies were designed and implemented as a joint team. In the beginning it was only these two persons in the team, but soon after the merger plans were released the team expanded and in the end it covered close to 1,000 people from Nokia and Siemens working as two mirroring organizations.
- The target of the NSN IT integration was clear: enable successful go-live of Nokia Siemens Networks according to the merger plan and ensure all operations work smoothly at DAY1 and after.
- The role reported the progress to a separate NSN Integration Board headed by the CEO of Nokia Networks. Global IT-spend of Nokia Networks had to be carved out from Nokia Business Infrastructure figures during the process.
- The IT integration office was established jointly in Helsinki and München so that bi-weekly the team changed the location.

2003 - 2006

Delivery Process Owner, Director (Head of Process & Tools)

Task information:

- The role was responsible for the development and deployment of Nokia Networks' Delivery Process globally. The work included the

management of delivery process strategy and roadmaps, development of related processes, concepts and information systems as well as the deployment of major transformation program that implemented new global operational model based on integrated, global SAP R3 platform for Nokia Networks.

- The role reported to COO of Nokia Networks.
- Over the years the organization included around 70-100 people across the world with 7-8 direct reports and five dotted line reports in Area organizations.
- Implementation of integrated SAP R3 based operational model for Nokia Networks covering more than 50 countries. The platform enabled full supply chain integration from customer frontline to factories' supply management providing a sustainable competitive advantage for Nokia Networks. In those days many benchmarks ranked NET supply chain as best in-class. The same integrated platform created basis for NSN that in 2008 was declared the overall winner at 12th European Supply Chain Excellence Awards.

2002 - 2003

### **Nokia Networks**

Head of Project Management Solutions, Solution Manager

Task information:

- The role was responsible for the development and deployment of Project Management IT-solutions at Nokia level. Main users were customer implementation teams of Nokia Networks. The work included the development of related IT-concepts and systems based on the user requirements from the business units.
- The role reported to the head of Delivery Solutions at Nokia Business Infrastructure.
- The team was around five people with 2 M€ annual budget.
- The creation and deployment of "IPM Suite" for Nokia Networks that were successfully utilized in customer implementation teams globally.

1997 - 2002

### **Nokia Networks**

Logistics Development Manager

Task information:

- The role was responsible for facilitating logistics development across Nokia Networks EMEA Area organization.
- The main task was to redesign the supply chain structure for base stations and implement the changes for European operator customers one by one. The change journey covered more than 35 customers and included the implementation of new distribution structure to provide customers short enough lead-time to build GSM networks effectively. During 1999-2002 Nokia and Helsinki

University of Technology carried out an action research based on experiences of this supply chain transformation.

- Implementation of the renewed EMEA distribution model for GSM base station solutions improved significantly customer satisfaction and supply chain efficiency. Inventory rotation in days reduced by 50% having a major positive impact on Nokia Networks financials.
- The logistics development manager's role was to actively participate the implementation and support the on-going research project. The implementation program provided relevant insight and research data for the academia.
- The role reported to the head of EMEA Logistics.

1994 - 1997

Logistics Specialist

Task information:

- The role was to develop and implement new logistics system and pricing tools to better manage Network Management system deliveries.
- The role reported to the marketing head of Nokia Cellular Systems / Mobile Switching / Network Management product line.
- Implementation of new logistics system and pricing tools in the product line.

## Positions of trust

2020 -

Board member at Valokuitunen Oy

2019 - 20

Board member at Telia Towers Finland Oy

2016 - 19

Board member at Trussmatic Oy

2013 -

Adjunct Professor, Aalto University

# Appendix B - NDA agreement signed with AB members

## NON DISCLOSURE AGREEMENT UNIVERSITAT POLITÈCNICA DE VALÈNCIA AND [AB member or company]

Universitat Politècnica de València, created with university status under Decree 495/1971 of 11 March (BOE of March 26, 1971), with registered office in Camino de Vera, s / n, Valencia (Spain), acting through the Department of Communications (hereinafter “DCOM”) and on its behalf Prof. Carlos E. Palau Salvador as Responsible Professor, who was appointed to the celebration of this act under the provisions of Article 137 of UPV Statutes, and the Internal Regulatory Rules. Hereinafter referred to as «UPV».

Of the other part, [AB member] with national identity card number [], acting on behalf of [Company, when of application], with registered office at [], with tax identification number [] (hereinafter referred to as “The Company”).

Party UPV and The Company are individually referred to hereinafter as the “Party” and collectively as the “Parties”.

The project *ASSIST-IoT – Architecture for scalable, self-\*, human-centric, intelligent, secure, and tactile Next Generation IoT* (hereinafter “The Project”) is a European project funded by the European Commission under the programme H2020-ICT-56. This project is coordinated by UPV (by Prof. Carlos E. Palau Salvador) and it is the object of agreement among the parties. UPV acts along this document as representative of the Consortium of partners of The Project. At the end of this Agreement, the signature of all partners is included to ratify their accordance to the Agreement.

Both Parties mutually acknowledge their legal capacity to enter into and be bound by this non-disclosure agreement and to that effect they state the following:

### WHEREAS

- I. UPV, through the DCOM, and particularly through researcher Prof. Carlos E. Palau Salvador, conducts research in the field of IoT.
- II. The Company is developing its activities in []
- III. UPV and The Company have considered the mutual disclosure of certain information regarding insights, results and any confidential information of The Project, necessary and desirable for the purpose of having The Company providing feedback on several matters of The Project, from its external expert viewpoint.
- IV. UPV proposes to The Company to be part of the Advisory Board of The Project as an actual member. Conditions of this collaboration are disclosed in the Consortium Agreement of the Project. This Agreement is being entered into by the Parties in order to protect the confidentiality and non-disclosure of confidential information, and to that effect, the Parties agree as follows:

## CLAUSES

### 1. PURPOSE OF THE AGREEMENT

- 1.1 The purpose of this Agreement is to establish the terms and conditions that shall govern the disclosure of Confidential Information between the Parties to evaluate a possible collaboration as described in recitals III and IV.

### 2. DEFINITION OF CONFIDENTIAL INFORMATION

- 2.1 “Confidential Information” means any information which is disclosed, either orally or in writing by a Party to this Agreement (hereinafter, “Disclosing Party”) to the other party (the “Recipient”) for the purpose of evaluating a possible collaboration between the Parties, including but not limited to scientific information, technical information, financial, legal and commercial information, business models and strategies, know-how, potential clients and partners, projects and transactions of any type or proposals under consideration, reports, plans, forecasts and market data, along with reports and working papers, compilations, comparisons, studies and in general, all the information which the Parties disclose either before or after the signing of this Agreement.
- 2.2 Particularly, the term Confidential Information includes, but is not limited to, any information regarding the Architecture, Technological components, IoT enablers, Open Call nuances, within The Project, software products, test and evaluation in pilots, data from stakeholders of the Consortium, the Innovation conclusions and studies, any potential standardization actions, private project deliverables, deadlines, inner schedules, mails exchanged between The Company and UPV and any identifiable personal information, apart from asset mentioned in 2.1.
- 2.3 The Parties agree to identify the exchanged Confidential Information. The Parties shall make a record of the meetings in which Confidential Information has been orally exchanged and shall mark any documents as Confidential Information. Notwithstanding the foregoing, the absence of such identification does not change the confidential nature of such information.

### 3. OBLIGATIONS OF THE PARTIES

- 3.1 The Parties shall exchange Confidential Information to explore possible ways of collaboration and are committed to take necessary and appropriate steps to preserve the confidentiality of the information so defined, and in particular:
- To use the Confidential information in confidence
  - Not to disclose or communicate the Confidential Information provided by the Disclosing Party.
  - To prevent the copy or disclosure of such information to third parties unless there is a written authorization of the Disclosing Party and only in accordance with the approved terms of such authorization.
  - To restrict access to Confidential Information to their respective employees, partners, subcontractors and any person who, due to their relationship with the Parties, could or should have access to such information, warning them of the duty of confidentiality.
  - To use Confidential Information or parts thereof exclusively for the purposes of implementing this Agreement, refraining from any other use.
- 3.2 The Parties will be liable to each other for the compliance of the above obligations, either by its employees, partners, subcontractors or any person to whom Confidential Information was disclosed.
- 3.3 The Parties agree to comply with any applicable data protection legislation.

#### **4. LIMITATIONS ON THE PROCESSING OF CONFIDENTIAL INFORMATION**

- 4.1 Without prejudice to the obligations described in the previous clause, the Parties may use or disclose Confidential Information that:
- a. is in the public domain or come into the public domain through means different to an infringement of the present Agreement by any of the Parties, or
  - b. has been independently developed by or for the Recipient Party, without any connection to the Confidential Information, and as long as such development can be documented by the Disclosing Party, or
  - c. was already known by the Recipient Party prior to the disclosure by the Disclosing Party, as long as the Recipient has documental evidence of such knowledge, or
  - d. the information comes from a third party not obliged by a confidentiality duty, or
  - e. should be disclosed pursuant to law or court or administrative order. In such a case, the Recipient Party shall immediately notify to the Disclosing Party such requirement so the Disclosing Party may exercise any interim measures that may be available by law, and shall not disclose any further Confidential Information to that strictly requested by court or administrative order.

#### **5. PROPERTY OF CONFIDENTIAL INFORMATION AND LACK OF WARRANTY**

- 5.1 The Disclosing Party has exclusive ownership over the Confidential Information. The exchange of information does not involve a transfer or license of rights to the Confidential Information.
- 5.2 The Disclosing Party makes no warranties in respect to the condition, accuracy, fitness for any purpose, correction, completeness or performance of the Confidential Information.

#### **6. PROHIBITION OF ASSIGNMENT**

- 6.1 Neither of the Parties shall assign its rights and obligations under this Agreement without the prior written consent by the other Party.

#### **7. BREACH**

- 7.1 The Parties acknowledge that any disclosure and unauthorized use of Confidential Information may cause damages to the Disclosing Party that may be difficult to quantify. Therefore, the Parties agree that the Disclosing Party shall have the right to claim before any competent court and to obtain from the other Party compensation for the damages resulting from such disclosure and unauthorized use.

#### **8. AMENDMENT TO THE AGREEMENT**

- 8.1 Any amendment to the Agreement shall be previously agreed by the Parties in writing and including an explicit reference to this Agreement in the new document.

#### **9. PARTIAL INVALIDITY**

- 9.1 In the event that any provision of this Agreement is held null and void, illegal or unenforceable, the remaining provisions shall remain valid. Before declaring any provision null and void, illegal or unenforceable it shall be construed, limited or amended so that the defect is corrected.

#### **10. TERM**

- 10.1 The present Agreement shall enter into force upon its signature and covers information disclosed for September 2020 until September 2021. It shall terminate in the cases provided in Clause 11 below; however, the obligations of confidentiality and non-use of Confidential Information by the Parties shall not be extinguished and will remain in force as long as the Confidential Information comes into the public domain without breach of the obligations of the Receiving Party.

- 10.2 The term established by the present clause may only be changed by virtue of any subsequent agreement expressly referring in writing to this clause (a generic reference to any previous agreements is insufficient).
- 10.3 The Parties undertake to ensure that agreements with persons and entities to which THIRD clause paragraph d) above refers are obligations with the same term, and in particular that such obligations will not be affected by the termination of employment, statutory or any other legal relationship.
- 10.4 Upon termination of this Agreement, or sooner if requested by the Disclosing Party, within seven (7) business days from the termination or from the request, the Recipient shall return the Confidential Information and destroy any copies, summary, synopsis, abstract, modified versions, or translations of the Confidential Information that had been made. Compliance by the Recipient of its obligations under this paragraph shall not entail termination or limitation of the obligations assumed in the preceding paragraphs.

## **11. TERMINATION**

- 11.1 In addition to the cases specifically regulated by the applicable legislation in force, the Agreement shall be terminated in the following cases:
- a. By the expiration of the contractual term agreed.
  - b. At any time, by mutual agreement in writing.
  - c. By the breach by a Party of any of the obligations under the Agreement, as long as such breach is not remedied within a maximum period of thirty (30) days after written request for the remedy, unless such breach is irreparable or makes impossible the fulfillment of this Agreement to the complaining Party, in which case the termination may be immediate, and in any case without prejudice to any claim for damages that may correspond to either Party.
- 11.2 Whatever the cause of termination of the Agreement, the provision of clause SIX above shall apply.

## **12. APPLICABLE LAW AND JURISDICTION**

The Agreement is a private agreement in its nature and shall be governed by the laws of Belgium.

The Parties agree that any dispute, controversy or claim arising under, out of or relating to this Agreement and any subsequent amendments of this Agreement, including, without limitation, its formation, validity, binding effect, interpretation, performance, breach or termination, as well as non-contractual claims, shall be referred to court proceedings before the corresponding Courts of Brussels.

## **13. ENTIRE AGREEMENT**

- 13.1 The Agreement, including all its annexes, shall be considered as the whole Agreement between the Parties and supersedes all other agreements or communications, written or oral, concluded between the Parties prior to the execution of the Agreement in relation to the purpose contemplated herein. The Agreement shall only be amended by virtue of written document signed by the Parties authorized representatives. The non-exercise of a right or power, whether before the courts or in any other means, does not imply waiver of such rights or powers hereinafter.

**14. NOTICES**

14.1 Any notices, requests, agreements, consents, acceptances, approvals or communications that are necessary in accordance with this Agreement, or which are associated therewith, shall be in writing.

14.2 Communications between the Parties relating to the exchange of Confidential Information and other aspects of ordinary execution of the Agreement will be made to the following persons:

UPV	<input type="text"/>
Name and surname: Carlos E. Palau Salvador Address: Camino de Vera, s/n, 46022, Valencia, Spain Email: cpalau@dcom.upv.es	Name and surname: <input type="text"/> Address: <input type="text"/> Email: <input type="text"/>

14.3 The change of the data provided by each of the Parties in the preceding paragraphs shall be notified to the other Party by certified means.

14.4 Other notifications may be made by fax or electronic mail as long as its source and destination can be demonstrated; written communication with notarial involvement; or any other written form that could reasonably provide evidence that the communication was made and the recipient should have received it.

In witness whereof, the Parties have executed two copies of the Agreement, in the place and on the date first above mentioned.

For and on behalf of UPV.	For and on behalf of The Company
March 2021	March 2021
Responsible Professor Prof. Carlos E. Palau Salvador	<input type="text"/>

The Consortium of The Project ratifies its accordance with this Agreement through the confirmation via written consent email endorsing the acknowledgment of Prof. Carlos E. Palau as the representative of the Consortium in Advisory Board matters.