Using competencies to guide training and professional development

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BioExcel celebrates 5 years

Mission "Provide Life Sciences researchers with high-quality, user-friendly software. Increase their expertise and skills. Strengthen the community."

Vision "Extreme-Scale Computing at the heart of Life Science research"


Blog - https://bit.ly/32bvtWU


Video on Twitter - https://bit.ly/38aVREc


Video on LinkedIn - https://bit.ly/3eAGINK

What is a competency?

Example "Install or deploy biomolecular simulation software on his/her computer or server"

Knowledge	Skills	Attitudes
Knows where to download software & dependencies to install	Selects appropriately packaged code	Checks licencing before installing/running software
Is aware of existing repositories and revision control systems (e.g. Git, Github, SVN, mercurial-versioning)	Is able to revert a system to a known state	Is open to use open software and to collaborate on its development

Formal definition

A Competency is an observable ability of any professional, integrating multiple components such as Knowledge, Skills and Attitudes.

The key aspects of the competency-based approach are:

- Competencies are observable, so acquisition can be validated objectively
- Evidence of competency can be collected in a competency portfolio
- Competencies are shared ‘currency’ applicable to learning of all types and at all career stages

What can you use competencies for?

- Course development
  - Determine what content to include
  - Pitch content at the right level
  - Write learning outcomes
- Strategic planning
  - Are you covering the priority areas/target group?
  - Provide overview to stakeholders
- Career development
  - Continued professional development
  - Annual appraisals or assessments
- Staff hiring
  - What competencies does your team need?

Structure of the BioExcel Competency profile

Level of detail

Domain

Competency

Usability

Knowledge

Skills

Attitudes

KSAs

Competency frameworks evolve over time

Version 1

Competency frameworks evolve over time

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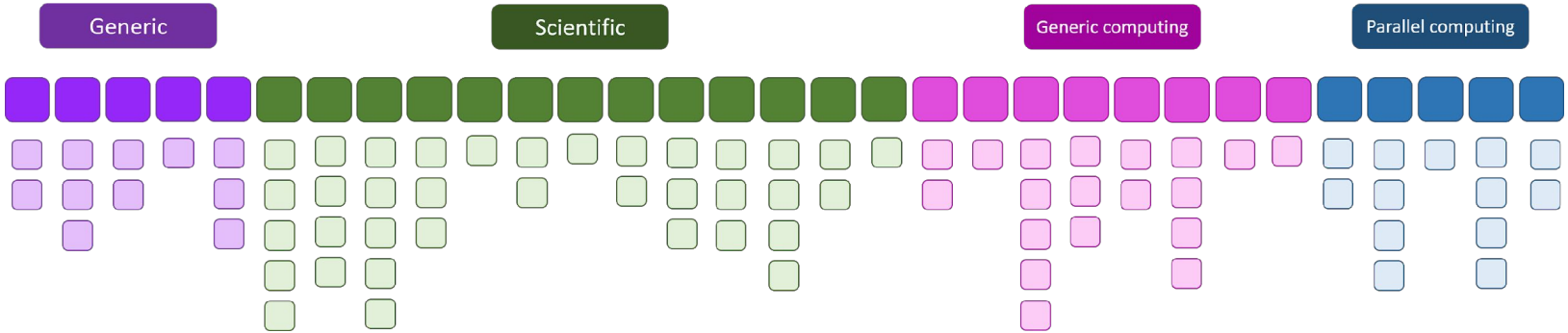
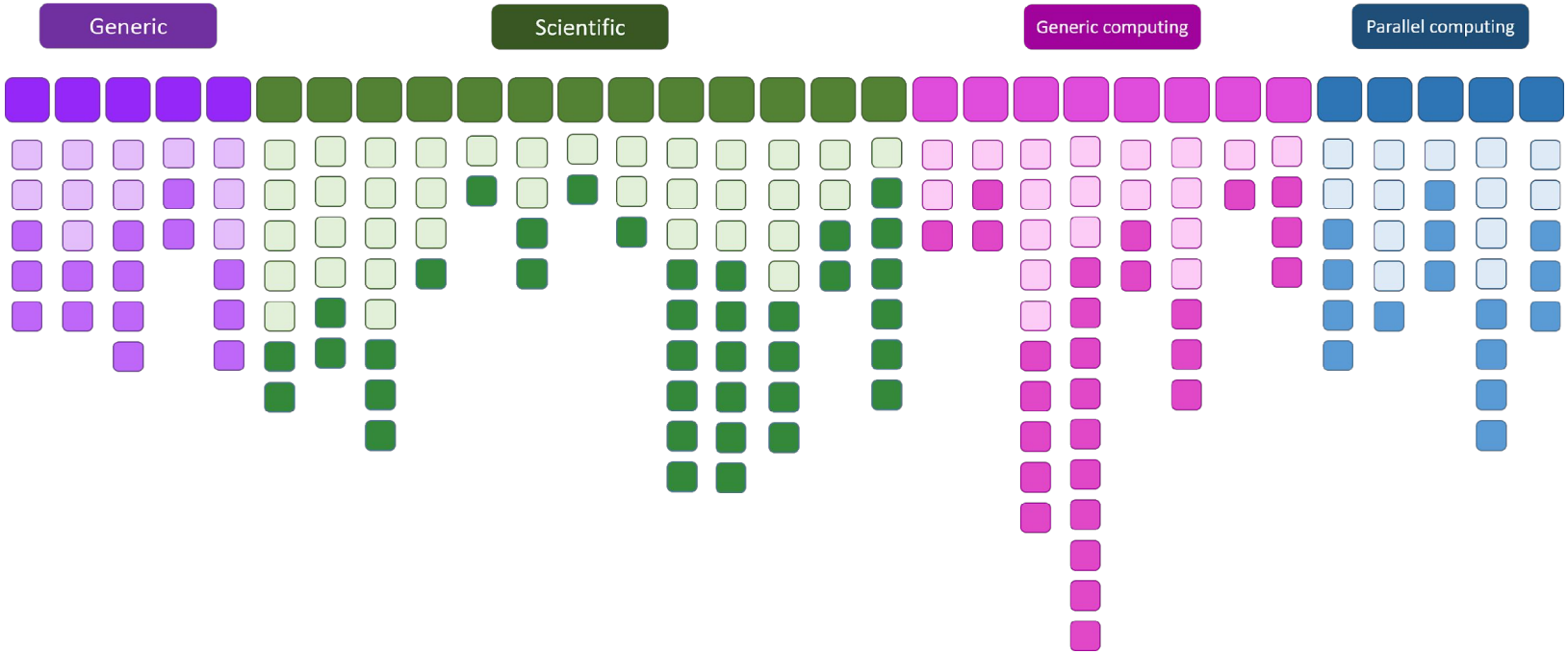
Version 1



Competency frameworks evolve over time

Version 1



Competency frameworks evolve over time

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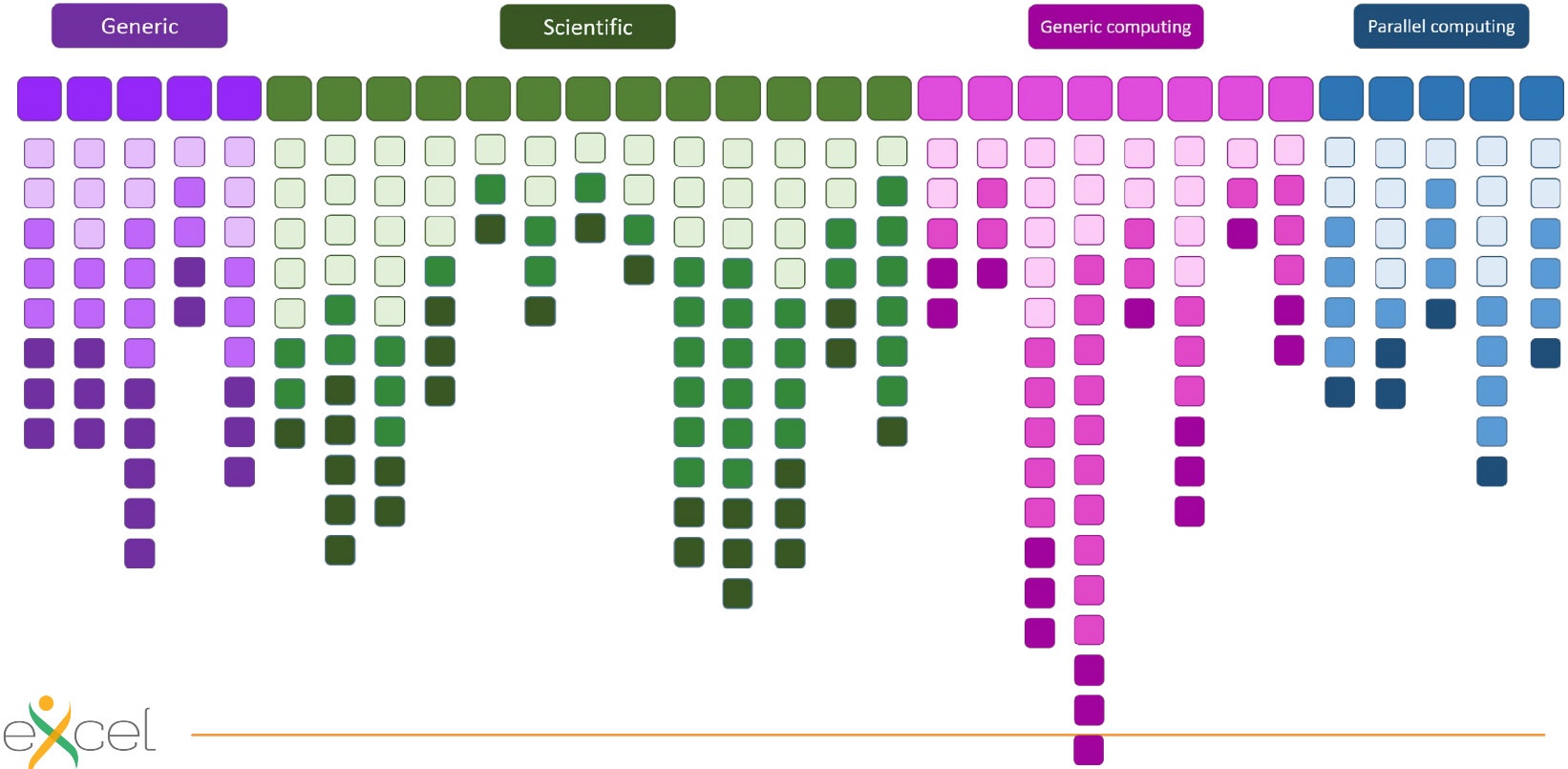
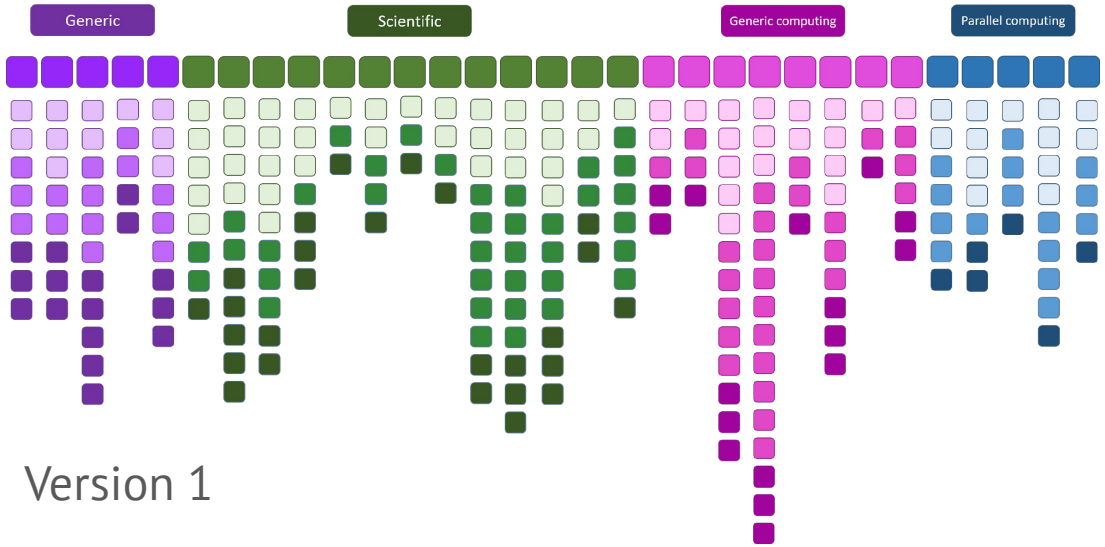


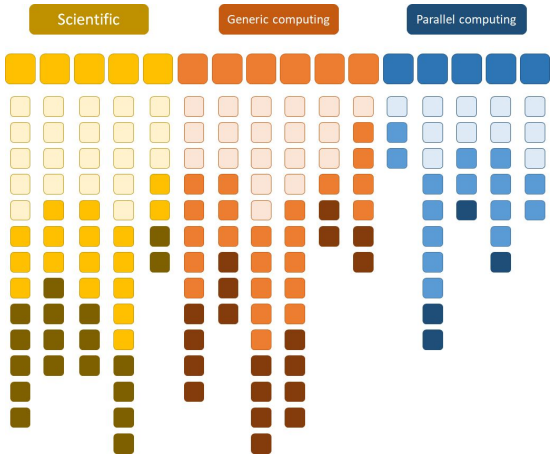
Competency frameworks evolve over time



Version 1

3 to 16 KSAs
1 to 10 attributes
511 elements

- Deprecated or dissolved competencies
- Merged competencies
- Consistency in number of KSAs
- Removed duplicate KSAs



Version 2

3 to 14 KSAs
0 to 5 attributes
166 elements

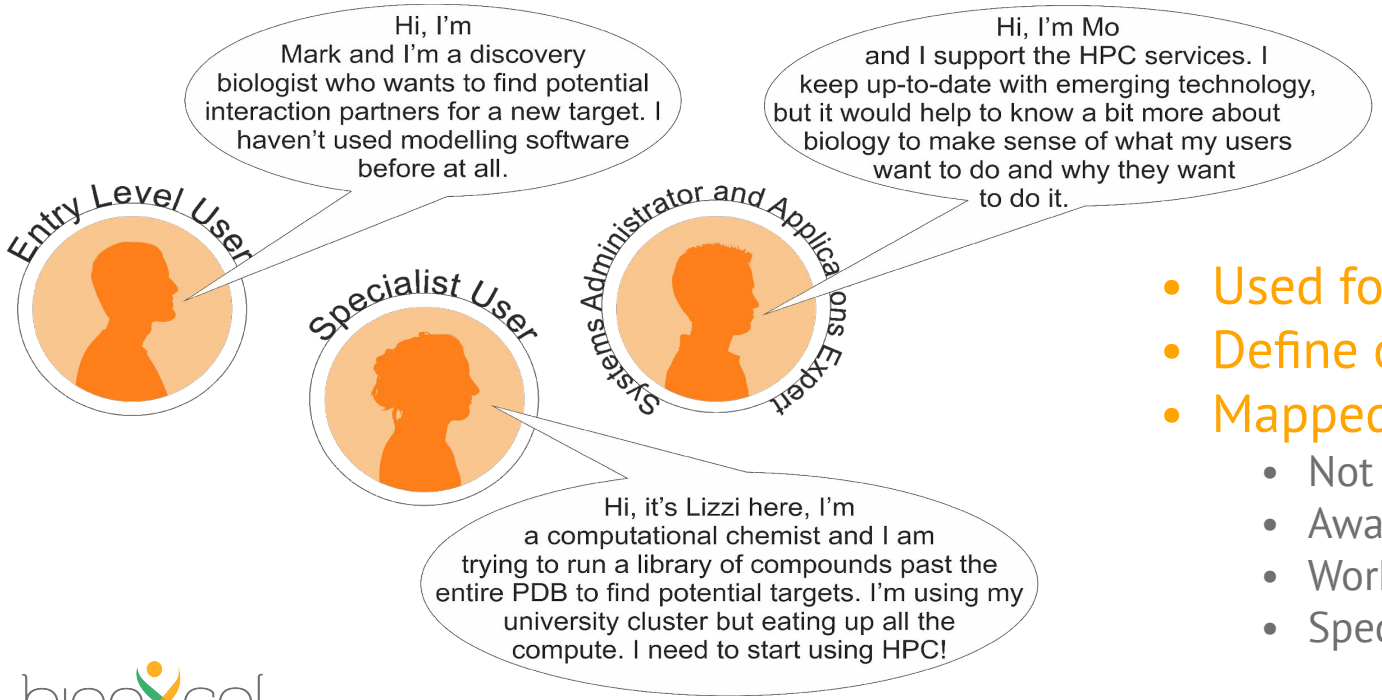
Plans for version 3 (before end 2021)

- A few gaps to fill at the KSA level
- A few discussion points
  - E.g. machine learning, visualisation

- Use the competency profile as a minimum standard
- Make competency profile machine readable

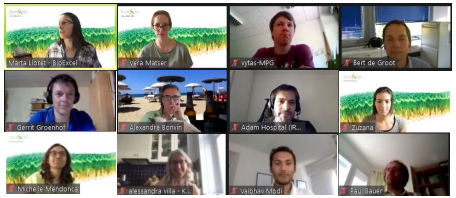
Enriching the competency profile

High level user profiles ⟹ Career profiles ⇢ *Learning pathways*



- Used for strategic planning
- Define our target audience
- Mapped to competencies
  - Not applicable
  - Awareness
  - Working Knowledge
  - Specialist knowledge

The BioExcel Training Programme



Virtual/Remote Training

Face-to-Face Training

Training Programme

Created Competency profile

Mapped competencies to training

Gap analysis

Competency Hub

Knowledge Resource Centre

The need for a sustainable home

Previous situation

- Competency profiles disappear in project deliverable or are in unusable/unfriendly formats (e.g. pdf)
- Unclear who the owner of the competency profile is
- Unclear if the competency profile is still maintained
- Competency profiles are scattered across many websites

The need for a sustainable home

- Created the BioExcel Knowledge Resource Centre as a proof of concept
  - A way to make the set of learning resources mapped to the competencies accessible to the community

- Created the EMBL-EBI Competency Hub as a neutral, sustainable home for competency frameworks

- The Competency Hub feeds data to the Knowledge Resource Centre (KRC)

What you can do in the Competency Hub?

- Explore competency frameworks
- Find training resources
- Explore career profiles
- Build your own profile
- Compare profiles
- Plan next steps

https://competency.ebi.ac.uk/

Competency Hub demo

https://competency.ebi.ac.uk/

Overview

Competency Hub is a web-based tool to support the creation and management of competency frameworks read more ›

Professionals in computational biomolecular research

Technical operators of biomedical research infrastructures

Managers of research infrastructures

Students and professionals in computational biology

Clinical practitioners for the application of genomics in the healthcare service

Professionals working with human data for disease research

If you have any questions, comments or suggestions, please contact us: competency [at] ebi.ac.uk

Career profiles - How we created them

- Input from several experts
- Job adverts and job specifications
- Include:
  - Background
  - Activities of the role
  - Map to the competencies

Career profiles

- Junior research software engineer
- Senior research software engineer
- Computational chemist (several levels)
- PhD student in biomolecular simulations
- Research associate in biomolecular modelling

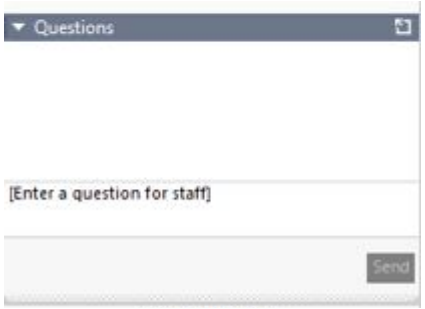
Future developments

- Learning pathways
  - Curated set of learning resources aimed at resolving a specific challenge
- Improve page navigation and user experience
- New competency frameworks
  - PerMedCoE - HPC/Exascale Centre of excellence in Personalised Medicine http://permedcoe.eu/
  - NPOS/ELIXIR competency framework for data stewards

What would you like to see?

- You can tell us in the GoToWebinar question box:
  - **“Suggestion: <your suggestion>”** (your email)

- Send us an email: competency@ebi.ac.uk



Do you want to get involved?

If you want to:

- Add your competency framework to the site
- Give us feedback about the site or the frameworks within it
- Suggest training resources
- Make suggestions on what to add to the tool

Please, contact us: competency@ebi.ac.uk

Best practice in competency community

- Version your profile
  - Release notes for new version
  - Old archived versions available
- Persistent identifiers for competencies and KSAs
- Clear ownership of frameworks
- Publicly accessible
- Making Competency frameworks FAIR
  - Machine readable
  - Minimum standard

Acknowledgement

Knowledge Resource Centre Competency Hub

Alba Gomez Segura (EMBL-EBI)

EMBL-EBI web development team:
- Prakash Singh Gaur
- Eduardo Sanz García
- Joseph Rossetto
- Carla Oliveira
- Niki Karamanis

Cristoffer Sevilla (EMBL-EBI)

Competency profile

Past and present BioExcel consortium

Mo Alibi (EMBL-EBI)
Brett McClintock (EMBL-EBI)

Career profiles

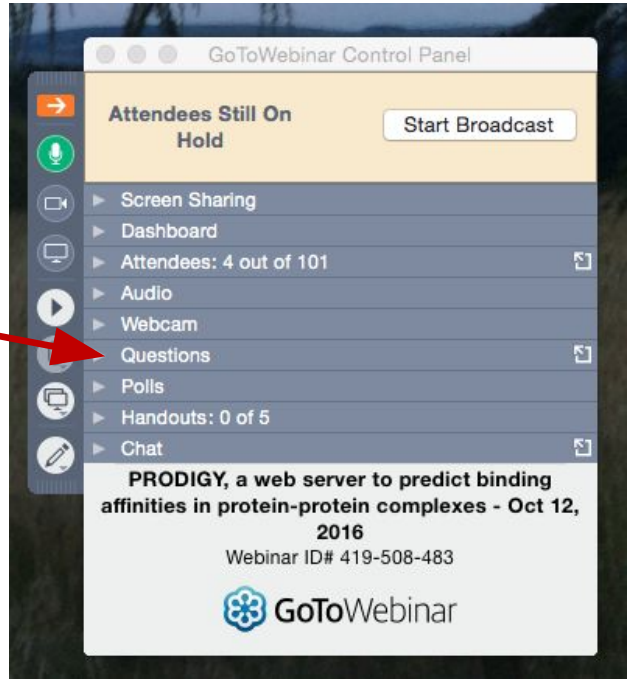
Arno Proeme (EPCC)
Salomé Llabrés (EPCC)
Richard Norman (NC)
Yvonne Westermaier (NBD)
Alessandra Villa (KTH)
Ian Harrow (IH)

Celia van Gelder, Mijke Jetten (NPOS/ELIXIR competency framework for data stewards)

Audience Q&A session

- Please use the Questions function in GoToWebinar application
  - If you *don't have audio*, please mention that in the question.

- Any other questions or points to discuss after the live webinar? Join the discussions at http://ask.bioexcel.eu.



Next Autumn BioExcel webinar

8 December at 15:00 CET

GROMACS-CP2K QM/MM interface

by Dmitry Morozov and Gerrit Groenhof

See https://bioexcel.eu/

virtual workshop on

Best Practices in QM/MM Simulation of Biomolecular Systems

https://bioexcel.eu/events/virtual-workshop-best-practices-in-qm-mm-simulation-of-biomolecular-systems/

Kick-off webinar recording available at https://www.youtube.com/c/BioExcelCoE

Speakers:

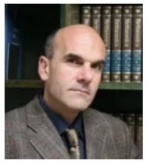

Maria João Ramos


Adrian Mulholland


Maria Khrenova


Ulf Ryde


Carme Rovira


Janez Mavri

BioExcel Partners

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BioExcel competency framework

Career profiles | Competencies | Training resources

Filter competencies

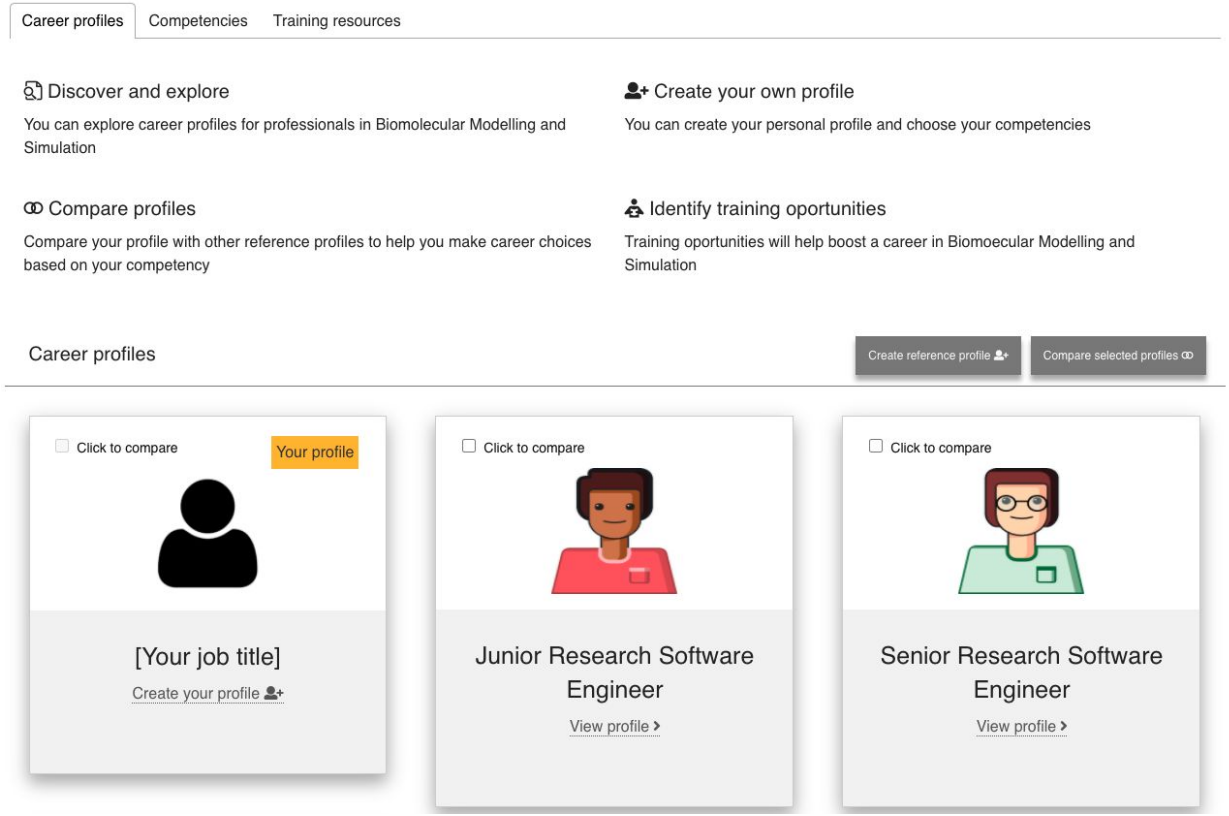
Scientific Competencies

- Apply expertise in formal & natural sciences appropriate to the discipline, and follow best practice in experimental design +
- User-driven service provision and support +
- Search for, assess and compile appropriate literature and data sets to address specific research questions +
- Comprehension of, and compliance with, best practice in data management / organization / archiving and storage and data management planning +
- Comprehension of how data-driven science, data analysis and computational modelling can be combined to generate and test hypotheses (e.g. machine learning, data mining, pattern recognition). +

Computing Competencies

- Evaluate the ability of a computer-based system, process, component, or program to solve a biomolecular problem (e.g., define algorithmic time and space complexities and hardware resources required to solve a problem). +

Career profiles



Career profile

Luca - Research associate in biomolecular modelling

None | 30 years

Create your profile ✚

Qualification and background

After a master in biomedical engineering in Sweden, Luca moved to France for a PhD in biophysics. During the PhD Luca investigated membrane permeation using molecular models.

Activities of current role

Luca works in a top medical institute in Austria as research associate and is part of a large team, composed by technicians and researchers, coming from different fields from chemistry to medical science. Luca's work focuses on the function-structure relationship of growth factors to help the new design of therapeutic tools.

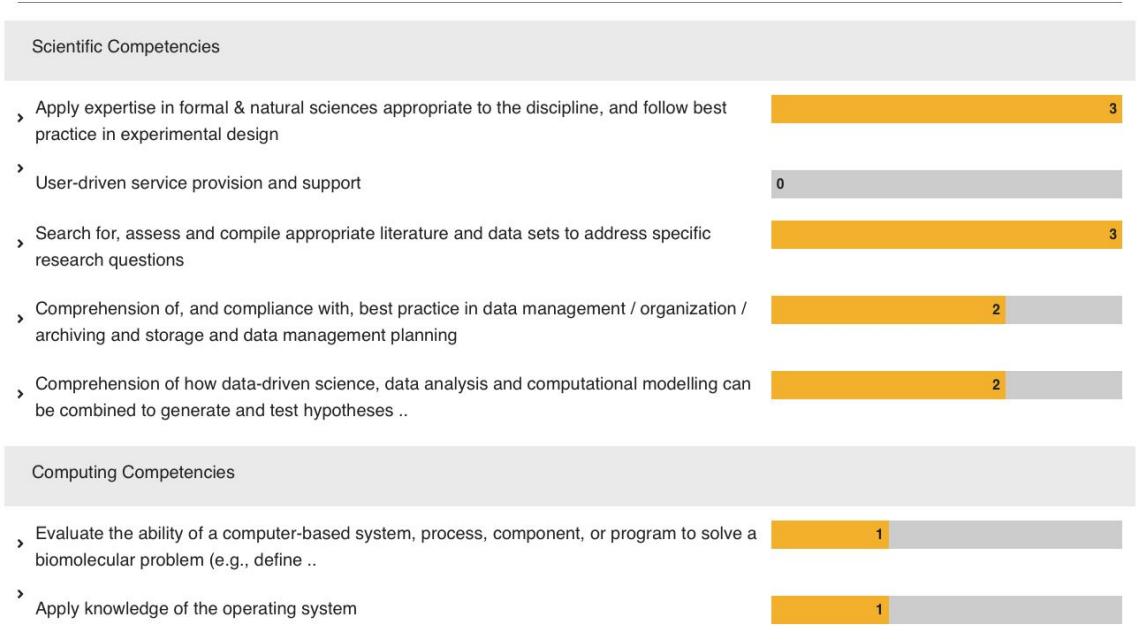
Luca's main task is to elucidate the function-structure relationship combining atomistic simulations and experimental techniques. Luca is responsible for dissemination of the research achievements and for the collaboration with other teams.

Luca speaks fluently Swedish, French, English and German and has a blog on popular science.

BioExcel 2.0 / Competencies

0 Not applicable 1 Awareness 2 Working knowledge 3 Specialist knowledge

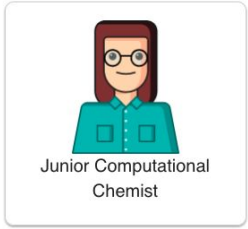
Career profile

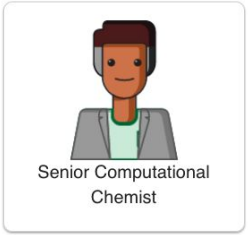


Compare profiles

Compare career profiles

Compere profile with other reference profiles to help you make career choices based on your competency





Rating levels 0 Not applicable 1 Awareness 2 Working knowledge 3 Specialist knowledge

BioExcel 2.0 / Competencies	Junior Computational Chemist	Senior Computational Chemist
	High Low	Low High
Apply expertise in formal & natural sciences appropriate to the discipline, and follow best practice in experimental design	3	3
User-driven service provision and support	0	0
Search for, assess and compile appropriate literature and data sets to address specific research questions	3	3
Comprehension of, and compliance with, best practice in data management / organization / archiving and storage and data management planning	2	3