

1 **Meaningful public engagement in the context of open science: reflections of early and mid-**
2 **career academics**

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15 **Abstract**

16 What is public engagement, what is needed for successful public engagement and how can
17 public engagement be perceived as part of open science? This commentary highlights
18 reflections on these questions from 15 public engagement fellows in Utrecht University's Open
19 Science Programme. With a goal of finding common ground intended as input for further
20 discussion and policymaking within the university and beyond, these reflections are based on
21 an analysis of twelve expert interviews conducted among and by the public engagement fellows.
22 We identify three key conditions for meaningful public engagement in the context of open
23 science: 1) room for diversity in (organizational) support and in rationales for the pathways
24 towards meaningful societal impact; 2) a broad conceptualization of open science, offering a
25 foundation for the structural integration of public engagement in academic work; and 3) the
26 need for a continuous dialogue amongst academics, support staff, and management on public
27 engagement and the conditions necessary to facilitate public engagement. Our findings suggest
28 that in order to make public engagement an integral part of open science, universities should
29 invest in institutional support, create awareness, and stimulate dialogue amongst staff members
30 on how to 'do' good public engagement.

31 **Keywords**

32 Public engagement; open science; rewards & recognition; citizen science; stakeholder
33 engagement; co-creation; science communication; reciprocity

34 **Key messages**

35 1. Public engagement has the potential to support the realization of open science, if a broad
36 diversity of motivations for public engagement is explicitly connected to open science policy
37 narratives.

38 2. Successful integration of public engagement in academic work requires collaboration in
39 changing the necessary policy and support systems and academic culture by academic and
40 support staff together, and with consultation of societal stakeholders.

41 3. The acknowledgment of public engagement as part of open science includes engagement
42 with societal stakeholders as well as with citizens and social communities. Recognising and
43 rewarding academic and support staff for meaningful public engagement activities is crucial
44 for the societal impact of academic work.

45 *The authors declare no conflicts of interest with this work.*

46 *The authors declare that this submission is original except for the two figures which are in the*
47 *public domain.*

48 **Introduction**

49 *“Public engagement is essentially about science in society. Positioning science as part of*
50 *society needs to be done better than it is now, in many ways. Making research accessible, letting*
51 *the public participate--showing that you listen, that they make a difference--that the image of*
52 *the ivory tower is not how we want academic research to work. To me, these are the big goals*
53 *behind open science. Public engagement is hugely important for that.” (interview E2)*

54 Public engagement is one of the four pillars of the Open Science Programme at Utrecht
55 University (Utrecht University, 2021). Open science is increasingly considered to be a
56 necessary step to regain public trust in science and to improve the reliability, efficiency, and
57 relevance of research (European Commission, 2019; Miedema, 2021; UNESCO 2021). The
58 contribution of engagement with societal partners and citizens to the accessibility and
59 legitimacy of science, is often acknowledged (Nowotny et al., 2001; Duncan & Oliver, 2021).
60 In practice, public engagement is sometimes still viewed as a welcome, yet nonessential by-
61 product of academic work. The goal of this commentary is to explore the role of public
62 engagement in open science. For this purpose, we interviewed twelve public engagement
63 fellows at Utrecht University, from a wide variety of disciplines. These fellows are part of an
64 intra-university network aimed at mutual learning about, and promotion of, public engagement.
65 Members are (mostly mid-career) academic staff and some support staff who have applied or
66 been invited to this network based on their involvement with public engagement. In this article,
67 we share thoughts and issues arising from these expert interviews that are intended as
68 inspiration and invitation for discussions regarding open science and public engagement. After
69 describing our method and explaining the position of public engagement within context of open
70 science at Utrecht University, we present the patterns that we discerned in our data along the
71 following three lines of discussion: What is public engagement? What is needed for successful

72 public engagement? How can public engagement be perceived as part of open science? We
73 conclude with lessons learned and suggestions for moving forward.

74

75 **Method**

76 Twelve fellows interviewed each other on their interpretation of public engagement and the role
77 it plays in their research. The goal was to find common ground and start the development of an
78 experience-based vision as input for further discussion and policymaking in various part of the
79 university (and beyond). Interviews were conducted online in pairs, and each fellow who was
80 interviewed was in turn responsible for conducting an interview with another fellow. Interviews
81 were recorded and transcribed and subsequently coded per theme in NVivo, using five key
82 questions as guiding principles: 1. What does public engagement mean to you? 2. Why do you
83 do public engagement? 3. Why is public engagement part of open science? 4. What is needed
84 for successful public engagement? 5. How does public engagement contribute to societal
85 impact? Fellows from different faculties teamed up in pairs and coded all subsequent data,
86 thematically analysing all interview transcripts, and discussing their observations. The codes
87 and observations were then discussed in the larger group. The interview and data analysis were
88 conducted following the ethical guidelines of the Faculty of Social and Behavioural Sciences
89 at Utrecht University.

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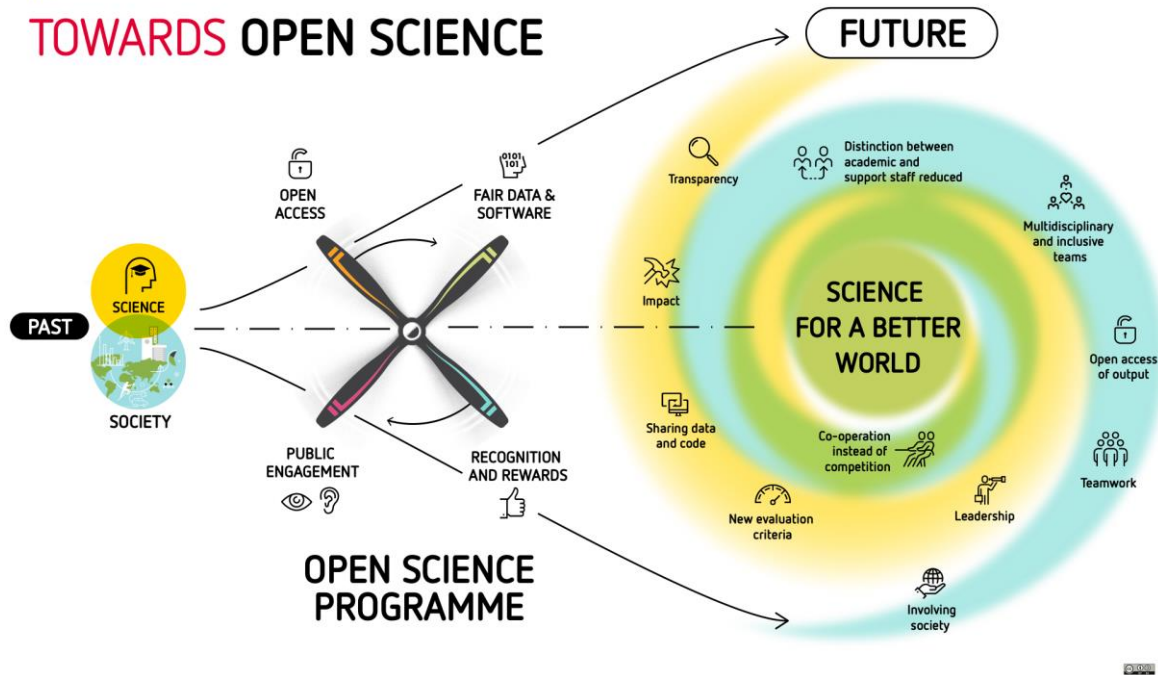
91 **Open science at Utrecht University**

92 Open science is generally understood as making science and scientific research available to all.
93 In the Dutch academic context, open science refers to “the transition to a new, more open and
94 participatory way of conducting, publishing and evaluating scholarly research” (National Plan
95 Open Science, n.d.). The idea that all aspects of research are shared as openly as possible lies

96 at the at the heart of open science. Prominently, open science requires action on FAIR data and
97 software, Open Access, and Recognition and Rewards.

98 At Utrecht University we also perceive public engagement as an integral and logical part of
99 open science (Figure 1). A rather unique and relatively early analysis that explicitly connected
100 open science and public engagement put forward the question whether open science should
101 “develop as a deep and bidirectional mode of engagement between members of the public and
102 researchers” (Grand 2012: iii). This perspective suggested several issues to address when
103 research is opened to a wider public, like shared practices and understanding of research
104 methods (e.g., data analysis) and of judgments about the validity and reliability of knowledge.
105 Academic questions, methods, data and results are not merely output to be shared by
106 researchers; they can also be translated, used and co-created by citizens and stakeholders
107 outside of academia (and from other academic fields or disciplines). This integral open science
108 approach of Utrecht University is the backdrop for our reflections on public engagement.

TOWARDS OPEN SCIENCE



109

110 Figure 1: Infographic illustrating the mission and vision of the Open Science Programme at
 111 Utrecht University (Source: https://www.uu.nl/sites/default/files/styles/original_image/public/Utrecht-University-towards-open-science.jpg)

112

113 Question 1: What is public engagement?

114 The fellows generally perceive public engagement as an umbrella concept that harbours many
 115 ideas about why, and in what ways academics can involve the public in their scientific
 116 endeavours.

117 First, fellows do have different views on the *degree of interaction* and the *effect* of public
 118 engagement. Some consider communication about scientific results to a non-academic audience
 119 as public engagement. Other fellows criticize such communication as a one-way perspective.
 120 In their view, public engagement is an inherently reciprocal process, in which academics and
 121 members of the public inform, surprise, and inspire each other: “*I see it as a mutual*
 122 *conversation going back and forth (...) at different times throughout the research process*”

123 (interview C2). Topics of discussion include not only research results, but also the research
124 process, the limits of scientific research, and ethical dilemmas related to research.

125 Second, elaborating the notion of public engagement as a reciprocal process, fellows
126 emphasized that the word ‘engagement’ in public engagement calls for commitment, both from
127 academics and the public, and requires an *open and collaborative attitude*. To some scholars,
128 this attitude comes naturally and as a result they thoroughly enjoy public engagement activities:
129 “*I commit myself to use the things I learn from the public in my research and teaching*”
130 (interview I2). Policy makers promoting public engagement should recognize that a natural ease
131 and willingness to engage with the public, is an important academic asset. Academics who
132 believe that public engagement is important, but lack such aptitude and experience, may
133 experience it as a burden.

134 Third, fellows pointed out that public engagement activities *should be context-*
135 *dependent*. For example, the nature of the engagement should vary with the public’s age
136 category, social background, degree of academic literacy, and impartiality to both the content
137 and the topic under discussion. These factors should not only affect the location of engagement
138 (e.g., whether the public is involved via (social) media, schools, public science festivals or
139 community centres) but also the means of engagement (e.g., whether the interaction takes place
140 via discussions with the public, interactive workshops, or active involvement in research
141 activities). When designing public engagement activities, academics need to take into account
142 the representativeness and accessibility of the publics involved. In discussing medical topics,
143 for example, patients could have a different interest than other citizens, and this should be
144 reflected in the design of the public engagement activity.

145

146 **Question 2: What is needed for successful public engagement?**

147 Three core themes arose from the fellows' reflections on what is needed to make public
148 engagement successful in the service of open science: 1) the skills needed to do public
149 engagement; 2) the institutionalisation of public engagement practices, means, and support, and
150 3) recognizing and rewarding public engagement for academics' professional and career
151 development.

152 *Skills* to do public engagement include, but are not limited to, being able to tell stories
153 and communicate in an accessible way (i.e., without jargon), being able to translate questions
154 from society to science and vice versa and being able to interact with various publics. Training
155 programs to acquire such skills should address the multiple forms of public engagement, and
156 help academics obtain the practical skills needed to integrate public engagement in the early
157 stages of research and teaching projects. According to the fellows, the most benefits can be
158 obtained by training early-career scholars (MA and MSc students, PhDs, postdocs) as they are
159 important conveyors of the (future) public engagement culture and valuable collaborators in
160 public engagement projects.

161 Due to a lack of such training, public engagement is mostly undertaken by those with
162 intrinsic motivation, skills, and experience. These motivated academics subsequently run the
163 risk of being over-burdened with public engagement tasks and requests, while their less-skilled
164 colleagues remain largely unasked and unsupported. *"If public engagement always loses out
165 amid teaching, writing papers, and applying for grants, then it's going to depend on personal
166 enthusiasm and the value individual academics place on it. That is vulnerable, that is too
167 vulnerable in my opinion."* (interview E2). For this reason, university wide support of public
168 engagement endeavours is essential for its successful and sustainable integration into the
169 academic system. In short, public engagement needs to be institutionalised.

170 *Institutionalisation* in this case refers to establishing public engagement in the culture,
171 structures, and procedures of the university. Fellows mentioned the need for a platform where
172 academics can find and learn about public engagement practices, and procedures for
173 incorporating public engagement in the early stages of research projects and teaching activities.
174 Furthermore, creating a formal public engagement community and an internal communication
175 network is perceived as an important aspect of institutionalisation of good public engagement
176 practices.

177 In the context of institutionalisation, fellows often mentioned the need for resources in
178 terms of sustainable funding, support, and allocated time. Without proper financing, many
179 programs lack continuity or sustainability. Whilst many faculties at Utrecht University provide
180 ‘seed funding’ for establishing new initiatives, structural financing for public engagement is
181 scarce. Finding time to develop and execute public engagement activities is a well-shared
182 concern amongst fellows. Public engagement can be time-consuming, and is often done in the
183 evenings, weekends, or in one’s spare time, because people lack the time for it during office
184 hours.

185 Moreover, good public engagement depends on a stimulating working environment,
186 which is an integral part of institutionalisation. It is important to work as a team, and to involve
187 students and early-career scholars in the process. “*What I would recommend to senior*
188 *academics: don’t go do it all yourself. Make it a team effort, where master’s students, PhD*
189 *students, and post-docs can help. Public engagement is a thing that you can do incredibly well*
190 *already at the beginning of your career”*. (interview D2) Existing support agencies within
191 universities can also help scholars think about their public engagement goals. As one respondent
192 suggested: “*perhaps resource support offices could help by asking questions like, ‘have you*
193 *thought about public engagement in the subsidy application you’re currently writing? Do you*
194 *have a fair data plan? An open access plan?’*” (interview C2)

195 *Recognizing and rewarding public engagement* refers to the informal and formal ways
196 in which public engagement is valued within the academic community: “*I don't think everybody*
197 *has to do public engagement. But every academic must be aware that there is a social contract*
198 *between science and society. We can't retreat into that ivory tower, that's a really outdated*
199 *idea*”. (interview D2). Currently, fellows experience what could be called a *public engagement*
200 *paradox*: what they are recognized for most, is rewarded the least. As one of them put it: “*My*
201 *podcast is perhaps the most appreciated thing I do, in reactions to grant proposals for example*
202 *(....) Yet getting a grant for a methodological research project is more highly valued than*
203 *getting one for a public engagement project (i.e., research is more highly valued, ed), although*
204 *the amount of funding may be similar*” (interview B2). To create *formal* appreciation of public
205 engagement, a diversification of careers should be facilitated from PhD level onwards,
206 according to the fellows. Recognizing and rewarding career diversification will help those who
207 want to excel in public engagement but currently lack the career opportunities to do so. At the
208 same time, the fellows indicated that academics who cannot, or do not want to engage with the
209 public should not be forced to do it. Academics have different interests and talents, and there
210 should be room for diversification.

211 Good public engagement, in the service of open science, partly depends on academics
212 being able to explain why public engagement activities are meaningful to their academic work.
213 Narrative approaches in performance assessment cycles could help them articulate such visions.
214 Furthermore, fellows indicated a need for a shared vision within the academic community about
215 what ‘good and effective public engagement’ is, also as a basis for estimating its value for the
216 scientific community.

217 Regarding the *informal* appreciation of public engagement, fellows highlighted the
218 importance of a stimulating and positive work culture, where supervisors and colleagues
219 explicitly express their appreciation for public engagement. What seems to underlie these three

220 key themes related to making public engagement a successful endeavour is the need to move
221 on from being ‘a group of enthusiasts and early adaptors’ to the structural embedding of public
222 engagement in the organization. One respondent summarized this as: “*It starts with inspiration,*
223 *then support, then acknowledgement*” (interview B2). Public engagement should be firmly
224 integrated in academic procedures and practices, while respecting the diversity of ways in which
225 people shape their public engagement activities.

226

227 **Question 3: Public engagement as an intrinsic part of open science**

228 Most fellows see public engagement as crucial for the success of open science. They view open
229 science as a broad movement that needs to establish collaborative connections between science
230 and society, with the aim of making the university a more reliable and relevant public
231 institution. Public engagement is seen as an essential means to achieve this.

232 Fellows laud the open science efforts of making data and publications freely available,
233 but agree that open access and open data are not enough to allow societal stakeholders and the
234 broader public to become part of the scientific process. Involving audiences in scientific
235 discussions requires inspiring and skilful public engagement that is tuned to the characteristics
236 of the public and the topic under discussion. In addition to the different interpretations of ‘public
237 engagement’, there are differences among fellows regarding the term ‘open science’. Some
238 fellows view it narrowly as making scientific publications, data, and software more accessible.
239 The majority, however, see open science more broadly as a movement that creates and arranges
240 partnerships between academia and society, with the aim of positioning the university as an
241 integral part of society, reflecting the broad approach taken at Utrecht University (see figure 1).

242 Most fellows view public engagement and open science as mutually reinforcing sets of
243 activities, for three reasons: 1) Both activities emphasize that scientific research is publicly
244 funded, which comes with the responsibility to *serve the public good* (cf. the notion of a social

245 contract mentioned earlier). To achieve this, interaction between academics and society is
246 essential; 2) Both activities aim to enhance *trust in science* and the university as a public
247 institution. They not only entail improving the accessibility of research data, publications, and
248 insights in research methods, but also organizing open discussions and input sessions about the
249 goals, methods, results, and implications of research; 3) Both activities share the belief that
250 participation of society *improves the quality and impact of science*. Accessibility and
251 transparency help academics to ask a wide range of important questions, from both academic
252 and societal points of view, thereby increasing the reliability and impact of their research.

253 Some fellows argued that including public engagement in open science is crucial
254 because it reinforces the goals of other open science practices like open access and open data.
255 They noted that making data and publications freely available is not enough to allow societal
256 stakeholders and the broader public to become part of the scientific process. Academics need
257 to organize public interactions and actively invite publics to participate in academic discussions.
258 This is where public engagement is essential.

259 Mostly, the fellows see public engagement as a means to an end; the overarching
260 strategy is open science, with public engagement as an essential contributing component. The
261 open science movement strives for more transparency and societal impact, and public
262 engagement is a way to achieve this because, on the one hand, it is a way to share research and
263 results with societal partners and citizens, and on the other hand, a way to ensure academics are
264 addressing questions that matter to society.

265 The interviews also revealed potential differences between public engagement and other
266 components of open science, for example on the issue of obligation. Fellows noted that while
267 every academic must adhere to open access and open data norms, not all academics should be
268 required to actively participate in public engagement activities. In that sense, public engagement
269 is considered less prescriptive than other aspects of open science. At the same time, fellows felt

270 that every academic needs to be aware of the ‘social contract’ between science and society,
271 which means they cannot retreat into their ‘ivory tower’ and must commit to the public good in
272 one way or another. In this broader sense, public engagement may be somewhat prescriptive
273 after all.

274

275 **Conclusion and recommendations**

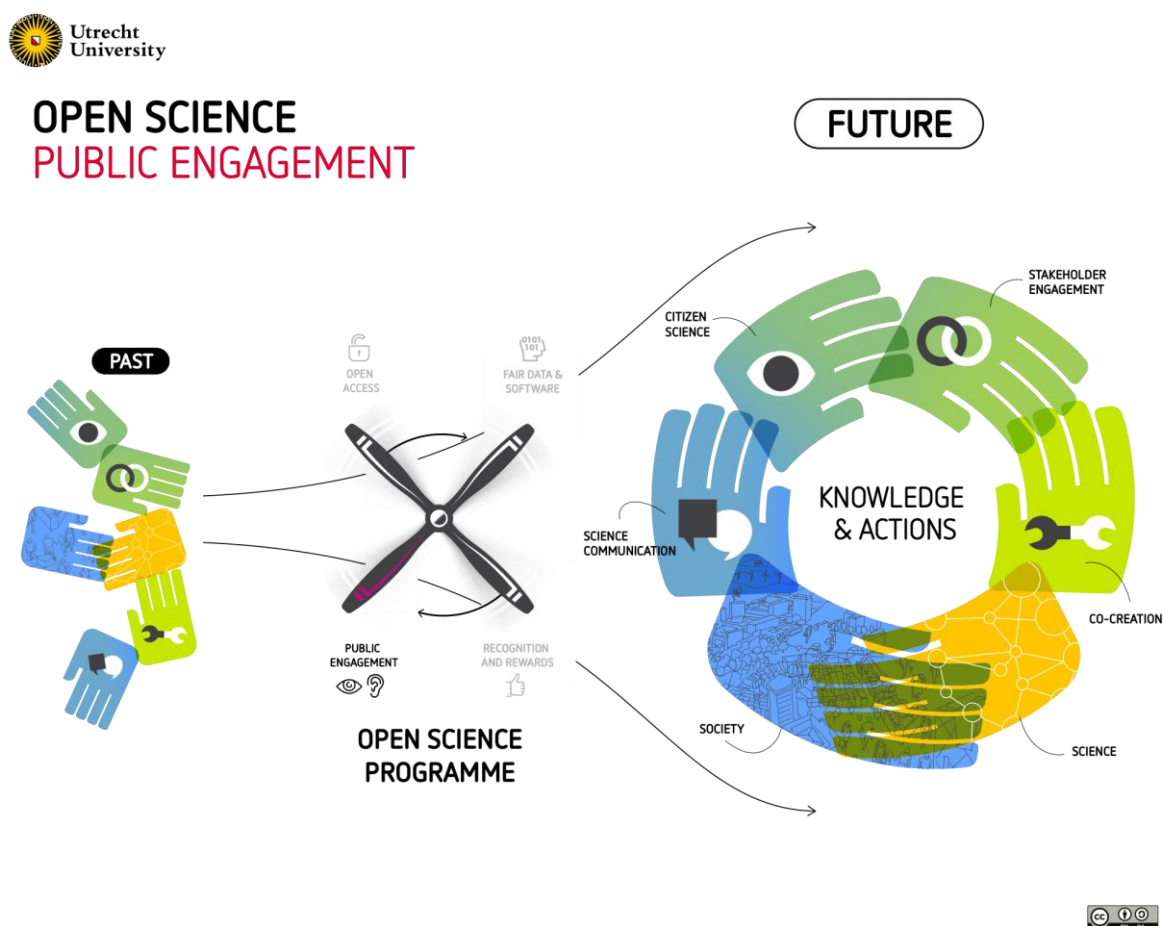
276 Our reflection on the relationship between public engagement and open science demonstrates
277 the dynamic, interactive process of doing open science, and how the thoughts and behaviours
278 of academics shape and are shaped by the institutional context in which they operate. Moreover,
279 our findings suggest that there is no prescriptive way of doing public engagement within the
280 broader context of open science. Rather, the nuanced reflections of fellows from multiple
281 scientific domains demonstrates the co-existence and development of various perspectives on
282 public engagement within a university. Under the umbrella of open science, public engagement
283 must be structurally embedded in the organization of the university. This needs to be done while
284 respecting the diversity of ways in which people shape their public engagement activities.

285 Public engagement includes practices as diverse as participatory research, science
286 communication, citizen science, transdisciplinary research and co-creation with stakeholders.
287 Such modes of engagement target different audiences, require different types of organizational
288 support, involve different motivations and incentives for academics, and differ in their
289 rationales as a pathway to societal impact.

290 A broad conceptualization of open science with a focus on interactions between
291 academia and society may offer a strong basis for the structural integration of public
292 engagement in academic work. Such a conceptualization should acknowledge the differences
293 and similarities outlined here, for open science policy development and implementation. The

294 conceptualization should speak to (and can be co-created by) university management, academic
295 and support staff, PhD students & postdocs, and societal stakeholders alike.

296 *Engaging* academics rather than *addressing* them as performers of public engagement,
297 requires a continuous dialogue with room for their personal motivations to be involved in public
298 engagement, and including the perspective of the publics and societal actors they engage with.
299 To support that dialogue in the academic community, we have created a visual representation
300 of public engagement as a collective of already existing practices, that can be connected more
301 productively and sustainably embedded when integrated in the movement towards open science
302 and the accompanying transition to new frames for rewarding and recognizing the value(s) of
303 academic work (Figure 2).



304

305 Figure 2: conversation starter on public engagement and open science at Utrecht University

306 (Source: <https://www.uu.nl/onderzoek/open-science/themas/public-engagement>)

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309 this manuscript.

310 **Academic Biographies**

311 **Wouter Boon** is associate professor in Innovation and life sciences. His research in the field of
312 innovation studies focuses on the dynamics and governance of emerging technologies in
313 science-based sectors, such as life sciences and healthcare. The focus of his work is on the role
314 of user innovations, user-producer interactions and stakeholder engagement in emerging
315 technology fields.

316 **Judith de Haan** is the Open Science Programme manager at Utrecht University. Since 2019,
317 together with her team, she is directing the integrated approach of the open science movement
318 at Utrecht University and connecting policies and plans with implementation. Her background
319 is in biomedical sciences as she received her PhD at the Experimental Cardiology department
320 at the University Medical Center in Utrecht (UMCU) in 2018.

321 **Carien Duisterwinkel** is Senior Advisor Stakeholder Relations at Utrecht University's Faculty
322 of Veterinary Medicine. In addition, Carien is involved in furthering the university's Open
323 Science Public Engagement strategy. With a background in International Relations and
324 Corporate Social Responsibility, Carien brings 15 years' experience in stakeholder relations
325 and project management at the interface between business and non-profits, in Europe and
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327 **Lauren Gould** is assistant professor in Conflict Studies at Utrecht University and the project
328 leader of the Intimacies of Remote Warfare (IRW). IRW is a research programme that aims to
329 inform academic, public and policy debates on the intimate realities of the remote wars
330 waged by advanced militaries. Dr. Gould is Public Engagement and Centre for Global
331 Challenge fellow, co-founder of the Contesting Governance platform, and board member of
332 the Nuhanovic War Reparation Centre.

333 **Willem Janssen** is associate professor in European and Dutch Public Procurement Law, School
334 of Law, Utrecht University, and a researcher at the Centre for Public Procurement (UUCePP)
335 and the Centre for Regulation and Enforcement in Europe (RENFORCE). His research delves
336 into questions on sustainability, social injustice, innovation and public procurement law.

337 **Karin Jongsma** is assistant professor of bioethics at the Julius Center of the University Medical
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339 digital health ethics. She obtained her PhD in medical ethics at the Erasmus University Medical
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341 network and has wide spread experience with public engagement and public outreach activities.

342 **Megan Milota** is assistant professor of Medical Humanities at the University Medical Center
343 Utrecht. She is responsible for introducing narrative medicine into the medical and paramedical
344 training programs in 2017, and continues to create and coordinate innovative and
345 interdisciplinary educational initiatives that focus on individuals' experiences and stories. As a
346 member of the New Utrecht School, Megan also organizes public dialogues and international
347 summer schools that thematize various issues in the healthcare domain.

348 **Maud Radstake** is head of the Public Programs office at the Centre for Science
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351 she received her PhD in Science & Technology Studies from Maastricht University in 2006.
352 Before coming to Utrecht, she worked as researcher, research manager and policy advisor at
353 Radboud University and Radboud University Medical Centre.

354 **Saskia Stevens** is assistant professor in Ancient History and Classical Civilization. Her
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356 Empire. She is currently PI of a multidisciplinary project on the Roman frontier in the
357 Netherlands, [Constructing the Limes](#) (2021-2026). After studying Classics at Radboud
358 University, she moved to Oxford University where she obtained her DPhil in Classical
359 Archaeology in 2010. She has been at Utrecht University since 2010.

360 **Madelijn Strick** is associate professor of Social Psychology at Utrecht University. Her main
361 expertise is the public engagement with science. She develops instruments to measure
362 the societal impact of public engagement projects and uses these instruments to identify the
363 working ingredients of "good" (i.e., impactful) public engagement. Her other main expertise is
364 the psychology of humor and how it affects social influence, communication, and well-
365 being. She teaches courses on social influence and communication.

366 **Marij Swinkels** is assistant professor at the Utrecht School of Governance (USG), Utrecht
367 University. She is passionate about academic teaching and public engagement, and connects
368 the two in a variety of ways. In her research, she explores how leaders deal with and learn from
369 transboundary crises and actively engages with stakeholders about the implications of her
370 research for leadership practice.

371 **Erik van Sebille** is professor of oceanography and public engagement at Utrecht University.
372 He investigates how ocean science can be used for sustainable development through public
373 engagement. After receiving his PhD from Utrecht University in 2009, he worked at the
374 University of Miami in the US, the University of New South Wales in Australia, and Imperial
375 College London in the UK before returning to Utrecht University in 2017.

376 **Niko Wanders** is assistant professor of hydrological extremes at Utrecht University. He studies
377 how humans impact the hydrological cycle and how floods and droughts impact societies.
378 After receiving his PhD in Physical Geography from Utrecht University (2015), he worked at
379 Princeton University in the US. There he worked on improving our understanding of droughts
380 and developing forecasting systems to reduce the impact of these disasters, before continuing
381 this work at Utrecht in 2017.

382 **Mara A. Yerkes** is associate professor of Interdisciplinary Social Science, Utrecht
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385 sexuality). Yerkes is PI of the European Research Council (ERC) project CAPABLE, a
386 comparative study on gender inequalities in work-life balance in eight European countries and
387 of CoGIS-NL (the longitudinal COVID-19 Gender (In)equality Survey Netherlands).

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