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**1 Research Statement** My approach to AI for science emphasizes epistemic AI: the design of intelligent systems that contribute not only computational horsepower but also conceptual innovation and human insight. I've worked with mathematicians, philosophers, and cognitive scientists, among others. Collaboration is important both to the content and form of my approach, and I have demonstrated leadership in strategy development, building interdisciplinary networks, and fostering research communities.

My work explores how computational systems can support and extend human creativity, collaboration, and understanding—particularly, but not exclusively, in open research. Joining you as Lecturer in AI for Science at King's College London would give me a platform to develop this agenda in a world-leading, interdisciplinary environment.

My academic trajectory has equipped me with deep technical skills in symbolic and statistical AI. My experience with startups, not-for-profits, and recently, in an administrative role working on the Research England project "Growing and Embedding Open Research in Institutional Practice and Culture", has given me a very strong understanding of the considerations surrounding research impact.

My doctoral research at The Open University introduced the concept of "peer-produced peer learning" — popularised with the neologism "peeragogy" by my mentor Howard Rheingold laying the foundation for a career interest in how learning and discovery unfold in distributed, collaborative systems. I have explored these themes in both computational and organisational terms. Key career highlights within AI include publications that model concept social creativity, with a particular focus on the mathematics domain. I have explored related themes in the cocreation of a strategy around open research at Oxford Brookes University. Computational tools for managing knowledge (including AI) are one of the themes I have looked at in my research consulting company, Hyperreal Enterprises. In particular, I am currently developing two proposals for the current AI for Collective Intelligence call (https://ai4ci.ac.uk/) that will run through Hyperreal.

One of these proposals concerns the first slice of a well-reviewed EPSRC proposal which didn't receive funding. This ambitious proposal is effectively outlines programme of work, focused on AI applications in knowledge production. The work involved will build on publications on argumentation and data mining frameworks that bridge the gap between human and computer mathematics, and models of the social and noetic processes of scientific and scholarly innovation. Equally important is the technical and social infrastructure needed to support open, reproducible, and participatory research, a skill area in which my current role has provided extensive, hands-on experience.

I see King's College London, with its rich ecosystem spanning health, natural sciences, and informatics, as an ideal environment to apply and extend this work. I am particularly excited by the opportunity to collaborate with colleagues in other branches of AI, science, and data-driven discovery, and to contribute to the university's goals around open and reproducible science.

In the next phase of my research, I aim to deepen and scale the use of AI tools that bridge between AI methods and real-world scientific practice. It is an exciting time to be working in this area, as AI tools with strong technical abilities are increasingly available, and in a state of readiness to support the deeper conceptual work that I have been concerned with throughout my career.

I see several potential avenues for collaboration with researchers at King's.

A close working relationship with your Dean of Research Culture, Professor Tim Newton, would help me build bridges across research disciplines there, including introductions to potential collaborators in the mathematics department. Building on my previous contract teaching experience within the Department of Digital Humanities, I would be interested to follow up on my acquaintance from co-teaching, Dr Barbara McGillivray, whose work on computational linguistics and interests in data-driven approaches to language align with my focus on epistemic AI and the modelling of human knowledge practices. I believe Professor Hana Chockler and Professor Elena Simperl, both in the computer science department, would be other key contacts. **2 Teaching statement** My teaching philosophy centers on empowering students to become active participants in their own learning process, developing both their technical skills and their ability to collaborate effectively in interdisciplinary contexts. I believe that education should not only transmit knowledge but also foster critical thinking, creativity, and a sense of responsibility in learners. To achieve this, I incorporate innovative teaching methods, such as peeragogy (peer-produced peer learning), which encourages students to teach and learn from each other in collaborative, self-organizing groups.

During my time as a contract lecturer at King's College London, I had the opportunity to teach courses related to data science, AI, and digital humanities. This experience gave me insight into how to guide students through complex topics, from theory to practical application. I emphasize an interdisciplinary approach, particularly in areas where AI and mathematics intersect with the humanities and social sciences, enabling students to understand the broader context of their technical work.

In my recent project, "Data Fairs, Matchmaking and Collaboration Patterns for Data Science Teaching," I explored how to create supportive environments for collaborative learning in data science. The project, run at the University of Edinburgh, used a peer-to-peer matchmaking system to pair students with complementary skills and interests, facilitating more effective group work and fostering a culture of knowledge sharing. This work has shaped my approach to teaching by highlighting the value of collaborative learning in complex subjects like data science, where diverse perspectives are essential for solving real-world problems.

I also developed and taught the course "Data Science for Design" at the University of Edinburgh, where I applied design thinking principles to data science problems. The course emphasized creativity, problem-solving, and communication, helping students to not only understand data analysis but also consider how their findings could be applied in practical, real-world scenarios. I aim to bring this same emphasis on real-world application to the classroom at King's College London, ensuring that students understand both the technical and social dimensions of AI and science.

At Oxford Brookes, I taught Data Analytics, where I balanced technical instruction with discussions of ethical and practical implications. This experience reinforced the importance of teaching not only technical proficiency but also critical thinking skills, helping students make informed decisions in their professional careers.

I am committed to supporting students' growth as independent researchers, collaborators, and critical thinkers. Through my teaching, I aim to create an environment where students feel encouraged to challenge their assumptions, explore new ideas, and work together to address the multifaceted challenges of AI and science.

# **3 References** Professor Peter Scott pscott@col.org (former PhD supervisor)

Dr Neil Jacobs (Head of Open Research Programme that I currently work on, based at University of Bristol)

Professor Nigel Crook ncrook@brookes.ac.uk Dean of Research and Innovation: Faculty of Health, Science and Technology (Supervisor for my Research Fellowship)

# 4 Personal details

**Summary** Dr. Joseph Corneli is an accomplished artificial intelligence researcher and leader in open research practice. He earned his Ph.D. from The Open University, where his thesis, "Peer Produced Peer Learning: A Mathematics Case Study," explored innovative approaches to collaborative learning. Dr. Corneli has held research positions at Goldsmiths College, the University of Edinburgh, and Oxford Brookes University, contributing significantly to the field of AI through projects like COINVENT and MathSoMac, which modeled social aspects of creativity. An active interest in metaresearch led him to his current role as Open Research Project Manager, and he consults on citizen science and outreach initiaves through Hyperreal Enterprises.

# **Current Positions**

Open Research Project Manager	Oxford Brookes University	(since
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I am employed on the Research England project "Growing and Embedding Open Research in Institutional Practice and Culture", working within a 20+ member consortium of UK universities. I am leading the evaluation of a train-the-trainer programme, in which 180 trainers will disseminate open research practices to 2700 local trainees. As a member of the Research Culture & Practice Team within the Research Innovation and Enterprise Directorate at Oxford Brookes, I also contribute to training design and delivery, data analysis, and to developing the institution's research culture as the UKRN Local Network Lead.

DirectorHyperreal Enterprises, Ltd.(since 6/2019)I consult on new citizen science and open data initiatives, using novel co-design methods. Clientsincluded the University of the West of England and Oxfordshire County Council.

#### **Previous Experience**

Role	Responsibilities	Results
Research FellowInstitute for Ethical AI, Oxford BrookesUniversity(10/2020-12/2022)	• research • grant writing	<i>innovation</i> in mathematical AI: £1.5m EPSRC proposal rated 16/18: "(very) strong"; and in virtue ethics applied to AI
<b>Associate Lecturer</b> Engineering, Computing & Mathemat- ics, Oxford Brookes University (2021- 2022)	<ul><li>teaching</li><li>supervision</li></ul>	<b>taught</b> undergraduate and post- graduate data analysis; super- vised Data Analytics MSc thesis "Code is Data"
Hourly Paid LecturerDepartment of DigitalHumanities,King's College London(2021-2022)	<ul><li>teaching</li><li>supervision</li></ul>	<i>supervision</i> of 7 Master's theses in Digital Humanities; delivered tutorials on web programming
<b>Member of cohort LD14</b> Entrepreneur First, a selective deep tech incubator programme (2020)	• product design • market research	<b>research</b> into consumer demand for AI tutoring systems, lead- ing to a design specification and business plan
<b>Software Engineer (Clojure)</b> Open Markets, developing a health- care equipment marketplace (2019)	<ul><li> programming</li><li> quality assurance</li></ul>	<b>engineered</b> 10x growth of the user base, with new single-signon feature for private client
<b>Research Associate</b> "MathSoMac", School of Informatics, University of Edinburgh (2016-2019)	<ul> <li>research</li> <li>academic writing</li> <li>teaching</li> </ul>	<b>published</b> papers on mathemat- ical knowledge production; co- developed "Data Science for De- sign" course
Research Associate "COINVENT", Computing, Goldsmiths, University of London (2014-2016)	• research • academic writing	<i>authored</i> the 'Best Paper' at Computational Creativity confer- ence (ICCC 2016)
<b>Research Assistant</b> "DECIPHER", Knowledge Media Insti- tute, The Open University (2013)	<ul><li>research</li><li>programming</li></ul>	<b>developed</b> a Semantic Web- based recommender system for museum professionals
<b>Editor</b> The Peeragogy Project, a collaborative investigation of peer learning (2012-) <b>Co-Director</b> PlanetMath.org, Ltd., which created an online mathematics encyclopedia (2008-2014)	<ul> <li>mentoring</li> <li>facilitation</li> <li>writing &amp; editing</li> <li>strategy</li> <li>outreach</li> <li>programming</li> </ul>	<b>coordinated</b> three editions of the Peeragogy Handbook; hosted the Peeragogy in Action podcast <b>developed</b> 'Planetary' with the KWARC research group (selected as a Finalist in Elsevier's Exe- cutable Papers challenge)
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#### Education

- PhD, Computing, The Open University. 2014.
- BA (Hons), Mathematics, New College of Florida. 2002.

**5 Contributions to the generation of new ideas, tools, methodologies or knowledge** Building on my work with the PlanetMath.org, Ltd., nonprofit — which hosted one the first collaboratively written online encyclopedias — peer learning on PlanetMath became the focal topic in my doctoral research at the Open University's Knowledge Media Institute. Media scholar Howard Rheingold was inspired by my work on "peer produced peer learning", and convened the Peeragogy project around this theme. These efforts informed scholars from various disciplines, e.g., the book *Re-imagining the Art School: Paragogy and Artistic Learning* by Neil Mulholland builds on the approach to peer learning that I helped develop; and there are over 400 hits for 'peeragogy' on Google Scholar in works published since the most recent edition of the *Peeragogy Handbook* came out in 2016. In my own postdoctoral research, I worked on projects in digital heritage, computational creativity and social machines ("DECIPHER", "COINVENT" and "MathSoMac"). In my Research Fellowship, I consolidated that work as the primary author of an interdisciplinary grant proposal outlining novel applications of artificial intelligence in mathematics.

# 6 The development of others and maintenance of effective working relationships

As the Director of Hyperreal Enterprises, I led a transdisciplinary team that consulted on Abby Tabor's £50K UWE Springboard project "Designing urban environments for human health: from the microbiome to the metropolis". I have supervised Master's theses in informatics, data science, and Digital Humanities, as well as two Google Summer of Code interns. At the University of Edinburgh, I helped develop a new course, "Data Science for Design", in which Master's students gained capacities to carry out innovative data-centric research projects.<sup>7</sup> This project was also awarded £14.8K of funding from the University of Edinburgh's Principal's Teaching Award Scheme ("Data Fairs, Matchmaking and Collaboration Patterns for Data Science Teaching"). I've spearheaded development of a similar programme at Brookes, which we ran as a "Data Challenge" in connection with our (second) Festival of AI. As an editor and podcast host in the Peeragogy project, I've facilitated dialogue and collaboration amongst researchers, entrepreneurs, educators, and innovators from around the globe.<sup>7</sup>

**7 Contributions to the wider research and innovation community** I helped develop a protocol, using Normalisation Process Theory, for evaluating a large 'train the trainer' project (180 trainers, 2700 local training recipients), and have contributed to the development of a community of practice that aims to make aspects of this offering sustainable in a peer-to-peer fashion, after the funded period ends. Early findings have been disseminated, e.g., with a poster at the International Research Culture Conference. Alongside this work, I have taken on other responsibilities within the Research, Innovation, and Enterprise Directorate at Oxford Brookes, for example, developing and presenting an analysis of diversity in the spin-out sector at the Enterpreneurship for All 2024 conference at Oxford University. I helped organise the 2023 OXBER Autumn School on Open and Reproducible Research, developed as part of the Oxford-Berlin Research Partnership. I previously organised research events on transdisciplinarity, creativity, and meta-research.'

8 Contributions to broader research or innovation-users and audiences, and towards wider societal benefit Peeragogy has had a strong reception in the Global South, e.g., I was invited to prepare a brief on the topic as part of Ecuador's Free Libre Open Knowledge society project.<sup>-</sup> In recent consulting engagements, I helped identify opportunities for practice improvement and collaboration within and among local social enterprises, community groups, and the local Council, with a focus on long-term social and ecological adaptation. I helped scope student projects in this area, at the launch of the Local Policy Lab at the University of Oxford. I organised an Oxfordshire Open Data Sandpit in connection with the 2024 AI Festival to develop further opportunities for collaboration, including additional student projects. I've also used my connection to UKRN to organise a sandpit for other Local Network Leads, which generated a submission to the 2025 Metascience conference, and to new grant proposals in progress.

**9 Additions** Having enjoyed working on mathematics research as an undergraduate, I enrolled in the mathematics department at the University of Texas in Austin for postgraduate study (2002-2004). However, I ultimately left to pursue independent research and collaboration with the PlanetMath project (2005-2009). During this time I also worked in the social care sector. I took another break from university research to work as a programmer (2019) and to participate in a selective entrepreneurship training programme (2020). My current role emphasises changing research culture over publication; nevertheless, some publications are planned, e.g., "Implementing the learning from training in Open Research Practices: An exploration using the frameworks of Normalisation Process Theory and the COM-B model".

# Journal papers

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12. Towards a National Open Research Culture, with a Training Community of Practice [NCRC Conversation Series; joint with Steve Boneham]. (2025)

- 11. Women and Spinouts: a Case for Action [Entrepreneurship for All Conference, 2024; joint with Simonetta Manfredi]. (2024)
- 10. The making of "Modelling serendipity in a computational context" [Serendipity Society Symposium on Serendipity and Big Data, February 2021]. (2021)
- 9. Looking for Serendip, Feeling Zembla [Creativity Week 2021; joint with Thomas Baruzzi]. (2021)
- 8. Experience Report: Steps to "Emacs Hyper Notebooks" [EmacsConf 2020; joint with Raymond Puzio, and Cameron Ray Smith]. (2020)
- 7. Emacs Research Group, Season Zero: What we did together with Emacs in 2 hours a week for a year [EmacsConf 2020; joint with Noorah Alhasan, Raymond Puzio and Leo Vivier]. (2020)
- 6. Towards a popular science of Buddhism [Student Cognitive Science Society, 10 October, Edinburgh, UK]. (2019)
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