

# Dr Joseph Angus Corneli

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## Degrees

PhD, The Open University (Computing), 2014      *award 12/08/2014; viva 17/12/2013; submitted 29/07/2013*  
BA, New College of Florida (Mathematics), 2002

## Doctoral and Postdoctoral Research Experience

**School of Informatics, University of Edinburgh** - Research Associate, 2017-2018, current position

I am helping create a computable model of “The Social Machine of Mathematics” (EP/R03169X/1/, EP/K040251/1) in a project led by Professor Ursula Martin. In Autumn 2017, I co-developed and taught on a new course, “Data Science for Design” at the Edinburgh College of Art. I’ve also contributed to grant development, with financial support from the EPSRC Platform grant EP/N014758/1.

**Goldsmiths, University of London** - Researcher in Computational Creativity, 2013-2017

Carried out research on social creativity in mathematics as part of the EU project COINVENT (611553), and coordinated consortium-wide evaluation activities. I also wrote Clojure code that interoperates with a Java codebase for automatic program synthesis that was developed in Simon Colton’s project on “Computational Creativity Theory” (EP/J004049/1). Publications included a paper for the top-rated journal *Artificial Intelligence*, and another that garnered the Best Paper Award at the Seventh International Conference on Computational Creativity.

**The Open University** - Research Student, 2010-2014      *Doctor of Philosophy (Computing)*, 2014

I made a case for learning mathematics the same way learning works in free/libre/open source software. My argument was supported by (1) statistical analysis of a decade of interaction data from the website PlanetMath.org that showed how social factors contribute to learning outcomes; and (2) user studies in a public deployment of a new software system for the site. A prototype of the system was a Finalist in Elsevier’s Executable Paper Challenge. I also edited the *Peeragogy Handbook*, which built on my thesis research, and helped increase its impact.

## Industry and Nonprofit Experience

**PlanetMath.org, Ltd.** - Co-Director (since 2008), contributor (since 2003)

I contributed to strategic planning, research, design, programming, supervision of interns, and technical editing at a 501(c)3 nonprofit. I represented the organisation at conferences, e.g., AMS/MAA Joint Mathematics Meetings.

**Cycorp, Inc.** - Associate Member of the Technical Staff, 2003

Carried out programming and knowledge representation work at a well-known AI firm.

## Teaching Experience

**Edinburgh College of Art, University of Edinburgh** - “Data Science for Design”, Autumn 2017

New cotaught course that provides an introduction to Python, data visualisation and data analysis at MSc level.

**Peer-to-Peer-University** - Four short courses (design, online facilitation), 2010-2011

“DIY Math”; “Mathematics for Game Designers”; “Open Governance and Learning” and “Shaping P2PU”.

## Selected Publications

### Journals

6. A. Pease et al. “Lakatos-style Collaborative Mathematics through Dialectical, Structured and Abstract Argumentation”. *Artificial Intelligence* 246 (2017).
5. J. Corneli. “Paragological praxis”. *E-Learning and Digital Media* 9.3 (2012).
4. J. Corneli et al. “Double bubbles in Gauss space and spheres”. *Houston J. Math* 34.1 (2008).
3. J. Corneli et al. “Double bubbles in  $S^3$  and  $H^3$ ”. *Journal of Geometric Analysis* 17.2 (2007).
2. J. Corneli et al. “The double bubble problem on the flat two-torus”. *Transactions of the American Mathematical Society* 356.9 (2004).
1. M. C. Alvarez et al. “Double bubbles in the three-torus”. *Experimental Mathematics* 12.1 (2003).

### **Conferences (since 2015)**

9. J. Corneli et al. “Towards mathematical AI via a model of the content and process of mathematical question and answer dialogues”. *Intelligent Computer Mathematics 10th International Conference, Proceedings*. 2017.
8. J. Corneli and M. Schubotz. “math.wikipedia.org: A vision for a collaborative, semi-formal, language independent math(s) encyclopedia”. *2nd Conference on Artificial Intelligence and Theorem Proving (March 26–30, 2017, Obergurgl, Austria)*. 2017.
7. J. Corneli. “An institutional approach to computational social creativity”. *Proceedings of the Seventh International Conference on Computational Creativity*. 2016.
6. J. Charnley et al. “The FloWr Online Platform: Automated Programming and Computational Creativity as a Service”. *Proceedings of the Seventh International Conference on Computational Creativity*. 2016.
5. M. T. Llano et al. “What If A Fish Got Drunk? Exploring the Plausibility of Machine-Generated Fictions”. *Proceedings of the Seventh International Conference on Computational Creativity*. 2016.
4. M. Kaliakatsos-Papakostas et al. “An Argument-based Creative Assistant for Harmonic Blending”. *Proceedings of the Seventh International Conference on Computational Creativity*. 2016. **(Best paper award)**
3. J. Corneli et al. “Patterns of Peeragogy”. *Pattern Languages of Programs Conference 2015, Pittsburgh, PA, USA, October 24-26, 2015*. 2015.
2. J. Corneli et al. “Computational Poetry Workshop: Making Sense of Work in Progress”. *Proceedings of the Sixth International Conference on Computational Creativity*. 2015.
1. F. Bou et al. “The role of blending in mathematical invention”. *Proceedings of the Sixth International Conference on Computational Creativity*. 2015.

### **Workshops (since 2015)**

7. J. Corneli et al. “Modelling the way mathematics is actually done”. *2017 International Workshop on Functional Art, Music, Modelling and Design (FARM 2017)*. 2017.
6. U. Martin et al. “Bootstrapping the next generation of mathematical social machines”. *Off the Beaten Track workshop at POPL, UPMC Paris, January 21, 2017*. 2017.
5. D. Winterstein and J. Corneli. “X575: writing rengas with web services”. *Workshop on Computational Creativity in Natural Language Generation (CC-NLG) held at INLG, September 5th, University of Edinburgh*. 2016.
4. J. Corneli and M. Corneli. “Teaching natural language to computers”. *Language Sense on Computers Workshop at IJCAI2016, July 9th, 2016*. 2016.
3. J. Gow and J. Corneli. “Towards generating novel games using conceptual blending”. *Proceedings of Experimental AI in Games 2 (EXAG2), 14-15 November 2015, Santa Cruz, CA, USA*. 2015.
2. J. Corneli and A. Jordanous. “Implementing feedback in creative systems: A workshop approach”. *Workshop on AI and Feedback at IJCAI2015, July 26th, 2015*. 2015.
1. J. Corneli and E. Maclean. “The Search for Computational Intelligence”. *Social Aspects of Cognition and Computing Symposium, Proc. AISB Convention, University of Kent, Canterbury, UK, 20-22nd April 2015*. 2015.

### **Book chapters (since 2015)**

3. J. Corneli and A. Pease. “Evaluating Creativity”. *Concept Invention: Foundations, Implementation, Social Aspects and Applications*. 2018, to appear.
2. J. Corneli et al. “Social Aspects of Concept Invention”. *Concept Invention: Foundations, Implementation, Social Aspects and Applications*. 2018, to appear.
1. S. Colton et al. “Stakeholder Groups in Computational Creativity Research and Practice”. *Computational Creativity Research: Towards Creative Machines*. 2015.

### **Edited volume**

1. J. Corneli et al., eds. *Peeragogy Handbook*. 3rd ed. 2016.

### **Additional scholarly engagement (since 2015)**

- OC “Enabling Mathematical Cultures” Oxford University, December 5-7, 2017.
- OC “AISB Member Workshop VII: Serendipity Symposium” St Mary’s University, June 15, 2017.
- Paper Shepherd for Pattern Languages of Programs, 2017.
- Reviewed for *Connection Science*, 2015, 2017.
- Reviewed for *Transactions on Learning Technologies*, 2016.
- PC International Conference on Computational Creativity, 2016, 2017.
- PC Conference on Intelligent Computer Mathematics 2015, 2016.