

# CHRISTIAN GUCKELSDERGER

## PhD Student in Computational Creativity

---

<b>Address</b>	Computational Creativity Group Department of Computing Goldsmiths, University of London 25 St James, SE14 6NW London, UK	<b>Date of Birth</b>	14 <sup>th</sup> December 1986
		<b>Nationality</b>	German
		<b>Email</b>	c.guckelsberger@gold.ac.uk
		<b>Phone</b>	+44 (0) 7884 706773
		<b>Twitter</b>	@CreativeEndvs

## Personal Profile

My goal is to engineer autonomous artificial systems that would be deemed creative in their own right by unbiased observers. I address this challenge with formal models of intrinsic motivation. In theoretical and applied studies, I demonstrate that such models can give rise to more general, robust and adaptive creative systems. For more information, visit <http://ccg.doc.gold.ac.uk/christianguckelsberger>.

## Education

**since Sep 2014**    **Goldsmiths, University of London, London, UK**

### PhD Student in Computer Science

Thesis:        Intrinsic Motivation in Computational Creativity with Applications to Games  
Funding:      Centre for Intelligent Games & Game Intelligence (IGGI)  
                    A leading PhD programme aimed at the games and creative industries.  
Supervision: Prof. Simon Colton (Goldsmiths/Falmouth Univ.), Dr. Jeremy Gow (Goldsmiths),  
                    Dr. Paul Cairns (University of York), Dr. Christoph Salge (New York University)

**2007–2014**        **Johannes Gutenberg-University Mainz, Germany**

### Magister Artium (M.A., 1st class)

Subjects:      History of Art, Computer Science, Business  
Thesis:        Design and Evaluation of Algorithms for the Creation of Novel  
                    and Unexpected Recommendations in Art Collections  
Funding:      In collaboration with SAP Research SE, Darmstadt, Germany  
Supervision: Prof. Matthias Müller (Mainz University), Dr. Jella Pfeifer (KIT Karlsruhe),  
                    Dr. Florian Probst (SAP Research).

### Bachelor of Science (B.Sc., 1st class)

Subject:        Computer Science  
Thesis:        Effects of Anticipation in Individually Motivated Behaviour on Survival  
                    and Control in a Multi-Agent Scenario with Resource Constraints  
                    In collaboration with the Adaptive Systems Research Group,  
                    University of Hertfordshire, Hatfield, UK  
Supervision: Prof. Daniel Polani (University of Hertfordshire),  
                    Prof. Stefan Kramer (Mainz University)

**2010 – 2011**     **University of Glasgow, UK (study abroad)**

Subjects: Arts & Media Informatics, Computer Science, History of Art

## Language Skills

- German: native language
- English: fluent (speaking, reading, writing)
- French: intermediate (reading); basic (speaking, writing)
- Latin: intermediate (reading, writing)

## Research & technical skills

- Advanced knowledge of formal models of intrinsic motivation and their cognitive science foundations. Very good knowledge of Computational Creativity as research field.
- Advanced knowledge in probability and information theory and (approximate) Bayesian inference. Good knowledge of statistics based on R.
- Advanced knowledge of agent-based modeling and multi-agent systems.
- Good knowledge of C++ (11x), Java, Python (SciPy, NumPy) and C#. Development with Visual Studio, XCode, Eclipse, and Spyder. Version management with GIT and SVN.
- Daily use of Microsoft Word, PowerPoint, Excel, Publisher. Occasional use of Adobe Photoshop and Premiere to create and edit research diagrams and videos.
- Some experience in game development based on the Unity and Unreal engines.
- Some experience in complex network analysis.
- Industry experience as agile developer based on Scrum.

## Training

- Research Methods & Skills (4-week workshop at the University of York)
- AI-driven Game Design (4-week workshop at the University of Essex)
- Game Development with Unity & Game AI (4-week workshop at Goldsmiths, University of London)
- Leadership Skills, Negotiation Skills, Presentation Skills (3 separate 2-day workshop at SAP SE)
- Scrum master training as preparation for working as scrum master for one year at SAP SE Research.

## Publications

### Journal Articles

- M. Biehl, **C. Guckelsberger**, C. Salge, S. C. Smith, and D. Polani. Expanding the Active Inference Landscape: More Intrinsic Motivations in the Perception-Action Loop. *Frontiers in Neurorobotics*, pages 1–26, 2018.
- Schulz A., **C. Guckelsberger**, and F. Janssen. Semantic Abstraction for Generalization of Tweet Classification: An Evaluation on Incident-Related Tweets. *Semantic Web*, 2015.
- **C. Guckelsberger** and D. Polani. Effects of Anticipation in Individually Motivated Behaviour on Survival and Control in a Multi-Agent Scenario with Resource Constraints. *Entropy*, 16(6):3357–3378, 2014.

### Conference & Workshop Proceedings

- **C. Guckelsberger**, C. Salge, and J. Togelius. New And Surprising Ways to be Mean: Adversarial NPCs with Coupled Empowerment Minimisation. In *Proc. IEEE Conf. on Computational Intelligence in Games (CIG'18)*, 2018.
- C. Salge, **C. Guckelsberger**, R. Canaan, and T. Mahlmann. Accelerating Empowerment Computation with UCT Tree Search. In *Proc. IEEE Conf. on Computational Intelligence in Games (CIG'18)*, 2018.
- S. Roohi, J. Takatalo, **C. Guckelsberger**, and P. Hämäläinen. Review of Intrinsic Motivation in Simulation-based Game Testing. In *Proc. 36th ACM Conf. Human Factors in Computing Systems (CHI'18)*, 2018.
- M. Biehl, **C. Guckelsberger**, C. Salge, S. Smith, and D. Polani. Free Energy, Empowerment, and Predictive Information Compared. In *Proc. 9th Int. Conf. on Guided Self-Organisation (GSO'18)*, 2018.
- **C. Guckelsberger**, C. Salge, J. Gow, and P. Cairns. Predicting Player Experience without the Player. An Exploratory Study. In *Proc. ACM Symp. on Computer-Human Interaction in Play (CHIPlay'17)*, 2017.

- **C. Guckelsberger**, C. Salge, and S. Colton. Addressing the “Why?” in Computational Creativity: A Non-Anthropocentric, Minimal Model of Intentional Creative Agency. In Proc. 8th Int. Conf. on Computational Creativity (ICCC’17), 2017.
- A. Denisova, **C. Guckelsberger**, and D. Zendle. Challenge in Digital Games: Towards Developing a Measurement Tool. In Proc. 35th ACM Conf. Human Factors in Computing Systems (CHI’17), 2017.
- **C. Guckelsberger**, C. Salge, and S. Colton. Intrinsically Motivated General Companion NPCs via Coupled Empowerment Maximisation. In Proc. IEEE Conf. on Computational Intelligence in Games (CIG’16), 2016.
- **C. Guckelsberger** and C. Salge. Does Empowerment Maximisation Allow for Enactive Artificial Agents? In Proc. 15th Int. Conf. on Synthesis and Simulation of Living Systems (ALIFE’16), 2016.
- **C. Guckelsberger**, C. Salge, R. Saunders, and S. Colton. Supportive and Antagonistic Behaviour in Distributed Computational Creativity via Coupled Empowerment Maximisation. In Proc. 7th Int. Conf. on Computational Creativity (ICCC’16), 2016.
- M. T. Llano, **C. Guckelsberger**, R. Hepworth, J. Gow, J. Corneli, and S. Colton. What If A Fish Got Drunk? Exploring the Plausibility of Machine-Generated Fictions. In Proc. 7th Int. Conf. on Computational Creativity (ICCC’16), 2016.
- A. Schulz, **C. Guckelsberger**, and B. Schmidt. More Features Are Not Always Better: Evaluating Generalizing Models in Incident Type Classification of Tweets. In Proc. Conf. Empirical Methods in Natural Language Processing (EMNLP’15), 2015.
- J. Corneli, A. Jordanous, R. Shepperd, M. T. Llano, J. Misztal, Colton. S., and **C. Guckelsberger**. Computational Poetry Workshop: Making Sense of Work in Progress. In Proc. 6th Int. Conf. on Computational Creativity (ICCC’16), 2015.
- M. T. Llano, M. Cook, **C. Guckelsberger**, S. Colton, and R. Hepworth. Towards the Automatic Generation of Fictional Ideas for Games. In Experimental AI in Games Workshop (EXAG’14), 2014.

## Reports

- **C. Guckelsberger**. Conference Report: Eighth International Conference on Computational Creativity. AISB Quarterly, (147), 2017.
- J. Corneli, **C. Guckelsberger**, A. Jordanous, A. Pease, S. Colton, and Y. J. Erden. Conference Report: AISB Members Workshop VII – Serendipity Symposium. AISB Quarterly, (147), 2017.
- **C. Guckelsberger** and A. Schulz. STATSREP-ML: Statistical evaluation & reporting framework for machine learning results. Technical report, Technical University Darmstadt, 2014.

## Patents

- **C. Guckelsberger**, F. Probst, and A. Schulz. Recommender system employing subjective properties, May 12 2016. US Patent App. 14/538,315 (pending).
- O. Grebner, M. Bruchmann, **C. Guckelsberger**, F. Probst, and A. Schulz. Reporting and managing incidents, July 22 2014. US Patent 8,786,433.

## Invited Talks

2017

### **University of Sussex Centre for Cognitive Science (COGS) Research Seminar**

Computational Creativity at the Edge of Being: Reconsidering Creativity and Intentional Agency in the Enactive AI Framework

### **ENactive Seminars Online (ENSO) Seminar**

Investigating the Role of Empowerment Maximisation in Constitutive Autonomy, Adaptivity and Open-Ended Development

### **University of Hertfordshire (Research in Adaptive Systems Group Seminar)**

Predicting Player Experience Without the Player. An Exploratory Study Based on Empowerment as Intrinsic Motivation

**Falmouth University (MetaMakers Institute)**

Intrinsic Motivation in Digital Games: From Steering Character Behaviour to Evaluating Game Content

**New York University (Games Innovation Lab)**

Intrinsic Motivation in Digital Games: From Steering Character Behaviour to Evaluating Game Content

**2016****University of Hertfordshire (Research in Adaptive Systems Group Seminar)**

Collaboration in Co-Creative Scenarios via Coupled Empowerment Maximisation: A Case-Study in Video Games

**Tungsten Centre for Intelligent Data Analytics**

Does Empowerment Allow for Fully Enactive Artificial Agents?

## Research Experience

**Apr 2018 –  
Jul 2018****Microsoft Research, Cambridge, UK**

Intern

Working on intrinsically motivated, collaborative AI in Project Malmo, an AI experimentation platform built on top of Minecraft.

**Jan 2018 –  
Apr 2018****Game Innovation Lab, New York University, New York City, USA**

Visiting Scholar

Fully funded research collaboration with NYU's Game Innovation Lab. Leveraging computational models of intrinsic motivation for game AI.

**Sep 2014 –  
Sep 2016****Goldsmiths, University of London, UK**

PhD Student

Additional research experience in European Commission FP7 project "What-If-Machine" (WHIM, grant no. 611560), spanning across 5 sites. Planning, execution and publication of multidimensional scaling experiments. Applied findings to use-cases in video games.

**May 2014 –  
Sep 2014****Darmstadt University of Technology, Darmstadt, Germany**

Student Research Assistant

Design and implementation of a tool for the automatic evaluation of machine-learning experiments. In particular advising on appropriate statistical tests.

**Jun 2011 –  
Dec 2013****SAP SE Research, Darmstadt, Germany**

Research- & Thesis Student

User experience design & development at SAP's international R&D department. Working on BMBF (German Federal Ministry for Education and Research) funded project "Infostrom" (grant no. 13N10711-15), spanning across 10 sites.

## Teaching Experience

**2017****Goldsmiths, University of London**

Guest Lecturer in Game AI Programming module (IS53049A)

B.Sc. Games Programming programme

**2016 – 2017****Goldsmiths, University of London**

Teaching Assistant for C++ in module Principles And Applications Of Programming (IS52028A/D)

B.Sc. Computer Science & Creative Computing programmes

## Workshop & Tutorial Organisation

- Co-organised the First Workshop on Curiosity in Games, held at the ACM Foundations of Digital Games conference (FDG) in Malmo, Sweden, 2018.
- Co-organised the Cybernetic Serendipity Reimagined Symposium as part of the AISB 2018 Convention at the University of Liverpool, Liverpool UK, 2018.
- Co-organised the AISB Members Workshop VII – Serendipity Symposium at St. Mary's University, London, UK, 2017.
- Co-organised the first tutorial on “Intrinsic Motivation in General Game-Playing and NPCs” at the IEEE Conference on Computational Intelligence and Games (CIG'16), San Torini, Greece, 2016.

## Awards and Funding

- 2018**                    **Best paper award at CIG 2018**  
Awarded for “New and Surprising Ways to be Mean. Adversarial NPCs with Coupled Empowerment Minimisation” at the IEEE Conference on Computational Intelligence and Games in Maastricht, Netherlands.
- 2017**                    **Honourable mention at CHI'Play 2017**  
Awarded for the paper “Predicting Player Experience Without the Player. An Exploratory Study” at the ACM SIGCHI Symposium on Computer-Human Interaction in Play in Amsterdam, highlighting our contribution as one of the top 5 papers in the competition.
- 2017**                    **AISB student grant**  
Travel grant to attend the 8th Int. Conf. on Computational Creativity (ICCC'17), Atlanta, US.
- 2016**                    **Mexican National Council of Science and Technology (CONACyT)**  
Conference fee waiver to attend the 15th Int. Conf. on the Synthesis and Simulation of Living Systems (ALIFE'16), Cancun, Mexico.
- 2014-2018**            **Engineering and Physical Sciences Research Council (EPSRC)**  
4-year full PhD stipend in the IGGI Centre for Doctoral Training: Intelligent Games – Game Intelligence.
- 2014**                    **Johannes Gutenberg-University Mainz, Germany**  
Prize for an outstanding Magister thesis
- 2013**                    **Johannes Gutenberg-University Mainz, Germany**  
Prize for an outstanding B.Sc. thesis
- 2010-2013**            **German Academic Scholarship Foundation (Studienstiftung des deutschen Volkes e.V.)**  
Germany's oldest and largest organisation sponsoring outstanding students irrespective of their political, ideological or religious convictions and affiliations.
- 2010-2011**            **German Academic Exchange Service (DAAD)**  
Full stipend to study one year abroad at the University of Glasgow from the world's largest funding organisation for the international exchange of students and researchers.
- 2010**                    **Sir Daniel Stevenson Exchange Scholarship (University of Glasgow)**  
Tuition fee waiver and small bursary to promote the friendly relations between the students of the Universities of Scotland and those of Germany, France and Spain.

## Attended Conferences

- IEEE Conf. Computational Intelligence and Games (CIG'18), Maastricht, Netherlands, 2018 (presentation).
- ACM Symp. on Computer-Human Interaction in Play (CHIPlay'17), Amsterdam, Netherlands, 2017 (presentation).

- 7th Int. Conf. on Computational Creativity (ICCC'17), Atlanta, US, 2017 (poster & presentation).
- IEEE Conf. Computational Intelligence and Games (CIG'16), San Torini, Greece, 2016 (presentation).
- Int. Conf. on the Synthesis and Simulation of Living Systems (ALIFE'16), Cancun, Mexico, 2016 (presentation).
- 7th Int. Conf. on Computational Creativity (ICCC'16), Paris, France, 2016 (presentation).
- Workshop on Experience and Creativity at the Int. Conf. on Case-Based Reasoning (ICCBR'15), Frankfurt, Germany, 2015 (attended).
- 6th Int. Conf. on Computational Creativity (ICCC'15), Park City, US, 2015 (attended).
- PROSECCO Code Camp on Computational Creativity, Coimbra, Portugal, 2015 (attended).
- 7th Int. Workshop on Guided Self-Organization at the Europ. Conf. on Complex Systems (ECCS'13), Barcelona, Spain, 2013 (presentation).

## Programme Committees

- 9th Int. Conf. on Computational Creativity (ICCC'18), Salamanca, Spain, 2018.
- IEEE Conf. Computational Intelligence and Games (CIG'18), Maastricht, Netherlands, 2018.
- ACM Symp. on Computer-Human Interaction in Play (CHI PLAY'17), Amsterdam, Netherlands, 2017.
- IEEE Conf. Computational Intelligence and Games (CIG'17), New York City, US, 2017.
- 8th Int. Conf. on Computational Creativity (ICCC'17), Atlanta, US, 2017.
- 7th Int. Conf. on Computational Creativity (ICCC'16), Paris, France, 2016.

## Journal Reviewing

- Artificial Life (MIT Press)
- Frontiers in Neurorobotics (Frontiers)
- Connection Science (Taylor & Francis)

## Professional Memberships

- **ACC:** The Association for Computational Creativity
- **ACM:** Association for Computing Machinery
- **AISB:** The Society for the Study of Artificial Intelligence and Simulation of Behaviour
- **IEEE:** Institute of Electrical and Electronics Engineers
- **ISAL:** The International Society for Artificial Life

## Referees

**Name** Prof Simon Colton  
**Institution** Goldsmiths / Falmouth University  
**Position** Professor of Computational Creativity  
**Contact** s.colton@gold.ac.uk

**Name** Prof Daniel Polani  
**Institution** University of Hertfordshire  
**Position** Professor of Artificial Intelligence  
**Contact** d.polani@herts.ac.uk