

Ovi Chris Rouly, PhD

Computational Social Science; Modeling & Simulation; Research

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EDUCATION

2015 PhD. Computational Social Science,

George Mason University, Fairfax, Virginia.

2000 M. S. Electrical Engineering,

New Mexico State University, Las Cruces, New Mexico.

1998 B. S. Computer Science,

Eastern New Mexico University, Portales, New Mexico.

1996 B. S. Psychology,

University of the Southwest (College of the Southwest), Hobbs, New Mexico.

TEACHING EXPERIENCE

Spring 2017: ETH Zürich, Lecturer in Computational Social Science, [851-0585-44L Social Modelling, Agent-Based Simulation, and Complexity](#), Department of Humanities, Social and Political Sciences program in Computational Social Science.

Fall 2016: ETH Zürich: Seminar Leader in Computational Social Science, [851-0585-41L Computational Social Science](#), Department of Humanities, Social and Political Sciences program in Computational Social Science program in Computational Social Science

Spring 2016: ETH Zürich, Lecturer in Computational Social Science, [851-0585-37L Social Modelling, Agent-Based Simulation and Collective Intelligence](#), Department of Humanities, Social and Political Sciences program in Computational Social Science.

2012-2012: George Mason University, Research Assistant, [CSS 723 Building Virtual Worlds](#), Department of Computational and Data Sciences program in Computational Social Science.

2004-2004: George Mason University, Adjunct Faculty, [ECE 447 Single-chip Microcomputers](#), Department of Electrical and Computer Engineering.

KEY SKILLS **Alphabetically:** adaptive system modeling; agent-based models anticipatory learning classifier systems (ALCS); autonomous systems; behavior; C#/C/C++ family; cognitive models; circuit design; collective intelligence; computational social science; engineer; evolutionary algorithms; genetic algorithms; geographic information system (GIS); hardware; individual-based models; Java; libopenmetaverse; machine intelligence; micro-controller design; modeling & simulation; Open Metaverse; Open Simulator; social media and networks; software; system/system design; virtual agents; virtual worlds.

EMPLOYMENT **2017-present** Visiting Assistant Research Professor; UCF; Orlando, Florida.
2016-2017 Lecturer (post-doc); ETH; Zürich, Switzerland.
2015-2016 Sci. Eng. & Tech. Advisor; Vencore/ONR; Arlington, Virginia.
2012-2014 Software Eng.; Harmonia Holdings, Blacksburg, Virginia.
2010-2011 Software Eng.; Camber; Centreville, Virginia.
2011-2015 PhD candidate; George Mason University, Fairfax, Virginia.
2007-2009 Student; George Mason University, Fairfax, Virginia.
2006-2006 Sci. & Eng. Advisor; I3/US Army; Arlington, Virginia.
2004-2006 Sci. Eng. & Tech. Advisor; SRS/DARPA; Arlington, Virginia.
2004-2004 Adj. Fac. Elec. Eng.; George Mason University; Fairfax, Virginia.
2003-2004 Sys. Eng.; Raytheon; Arlington, Virginia.
2002-2003 Hardware Eng.; Synergy; San Diego, California.
2000-2002 Hardware Eng.; Tech-One/Honeywell, Phoenix, Arizona.

RESEARCH INTERESTS Computational Modeling & Simulation of Evolutionary and Small-group Social Behavior

Complex Adaptive Systems (*Complex Social Systems, Emergent Small-group Behaviors, Emergent Social Organization, and Emergent Social Culture*)

Soft Computing and Machine Intelligence (*Evolutionary Algorithms, Fuzzy Logic, Artificial Spiking Neural Networks, and P-Type Algorithms*)

Computational Modeling of Bio-psychological Drives

Agent-Based Modeling / Individual-Based Modeling

Virtual Agents / Virtual Worlds (2D & 3D Modeling)

ACTIVE RESEARCH Create plausible sociality between intelligent virtual agents inhabiting virtual worlds. Demonstrate evidence of emergent reciprocal exogamy, collective intelligence, and complex social organization in-silico using open-source, virtual world technologies and embodied and situated machine intelligence.

COMPLETED RESEARCH

2014-2015: *At the root of sociality: Working towards emergent, permanent, social affines.* This research was fundamental to my PhD dissertation. A paper describing the scientific method and the results was accepted by the European Conference on Artificial Life 2015 in York, UK.

2013-2014: *Midwife: CPU cluster load distribution of Virtual Agent AIs.* This research developed an extensible algorithm for hosting scalable numbers of virtual agents (autonomous and adaptive cognitive clients) on a CPU cluster. A paper describing the work was presented at the 8th International Conference on Complex, Intelligent, and Software Intensive Systems in Birmingham, UK.

2012-2014: *Missile Defense using Anticipatory Learning Classifier Systems.* This research (completed on behalf of the United States Missile Defense Agency) involved simulating an antagonistic foreign state using a simplified agent-based model of offensive ballistic missile launch behaviors onto friendly state assets. An Anticipatory Learning Classifier System was developed and used to predict foreign state behavior in advance of a hostile launch. Harmonia Holdings, Blacksburg, Virginia. (Results are company proprietary.)

2011-2011: *Sexually differentiated philopatry and dispersal: A demonstration of the Baldwin effect and genetic drift.* This research developed an agent-based model of primitive human behavior. The work involved joining artificial genetics, cognitive theory, and socio-spatial constraints to demonstrate simulated fission-fusion, the Sewell effect (genetic drift), and the Baldwin effect (ontogenetic evolution) in autonomous agents. A paper describing the work was presented to the Computational Social Science Society of America conference in Santa Fe, New Mexico.

2010-2011: *Modeling pedestrian ingress and social behavior at a large venue.* This research used a geographically accurate 2D grid and mobile software agents to consider suspicious pedestrian behavior among at large events. (Completed on behalf of the United States Department of Homeland Security.) Camber, Inc., Centreville, Virginia. (Results are company proprietary.)

2010-2010: *Late Pleistocene Human Migrations: An Agent-based Modeling Approach.* This research developed an agent-based model simulating human migratory behavior during the Last Glacial Maximum. The model used distributed computation to create a geographically accurate, grid-based world populated by autonomous, mobile software agents. A paper describing the work was presented to the 3rd World Congress on Social Simulation in Kassel, Germany and (in Abstract form) to the 2010 Computational Social Science Society conference in Tempe, Arizona.

**COMPLETED
RESEARCH
(cont'd)**

2009-2010: *Social Decision Making Processes in Tribal Afghanistan: an Agent-based Model.* (The Measles Model.) This research considered a complex, emergent social behavior believed associated with the socio-judicial decision making process called a "Jirga," commonly practiced by the Pashtun tribes of Afghanistan. It was found that exogenous (external) political interference that suppressed the process could elevate social unrest, precipitate violence, and eventually lead to Improvised Explosive Device usage under the right conditions. An Abstract describing the work was presented to the 2010 Computational Social Science Society conference in Tempe, Arizona. (Completed on behalf of the United States Joint Improvised Explosive Device Defeat Organization.) Krasnow Institute for Advanced Studies, George Mason University, Fairfax, Virginia.

2007-2007: *Learning automata and need-based drive reduction.* This research created a simulation of adaptive, machine intelligence-enabled, mobile agents operating in a 2D maze. Agent behavior control was based on the psychological theory of Maslow's 1943 Hierarchy of Needs and Turing P-Type automata. A paper describing the work is among the proceeding of the 8th International Conference on Intelligent Technologies: Intelligent technologies in robotics and automation in Sydney, Australia.

2006-2006: Science and Technology Advisor to the US Army Rapid Equipping Force (USA REF). Provided scientific and technical analysis and system assessment support to the Army and the Joint Improvised Explosive Device Defeat Organization (JIEDDO) across a broad range of tactical and force protection systems. I3, Arlington, Virginia. (Results are company/government proprietary.)

2004-2006: Science, Engineering, and Technical Advisor (SETA) to the Defense Advanced Research Project Agency (DARPA). Provided program transition assistance, innovation, advice, and concepts in the areas of simple and complex, underwater, ground, and airborne, autonomous and adaptive, robotic, electromechanical and heavy-fuel, manned and unmanned, force protection systems to the US Army/DARPA transition liaison office. SRS, Arlington, Virginia. (Results are company/government proprietary.)

2003-2004: Independent and collaborative efforts to develop new cognitive, unmanned, and robotic systems for Raytheon DoD customers from a systems perspective. These autonomous and adaptive systems designs used the technologies of computer code and cybernetic theory. Raytheon, Arlington, Virginia. (Results are company proprietary.)

**COMPLETED
RESEARCH
(cont'd)**

2002-2003: Redesigned a VME-based, PCI to PMC 1GB memory bus adapter and did preliminary module-level verification for a one GHz PPC 7455 single board computer. PCB design. Synergy, San Diego, California. (Results are company proprietary.)

2000-2002: Designed and built two VHDL-coded programmable gate-array circuits: one for the Boeing 777 Flight Management System computer and the other for a PCI target application. Additionally, revised and prepared three programmable circuits for FAA qualification testing. One chip was ABEL-coded and the other two were Verilog-coded. Honeywell Commercial Aerospace Systems, Phoenix, Arizona. (Results are company proprietary.)

**PROFESSIONAL
SOCIETIES**

American Association for Artificial Intelligence

American Psychological Association

Evolutionary Anthropology Society

Institute of Electrical and Electronics Engineers

**INVITED
SEMINARS**

November 29, 2016 – *Building an interactive multi-agent system in a Virtual World: Monopoli reveal.* International Congress on Agent Model, George Mason University (GMU), Fairfax, VA.

November 1, 2016 – *Building an interactive multi-agent system in a Virtual World: Monopoli reveal.* Department of Teaching and Learning Research, ETH Zürich.

April 24, 2015 – *At the root of sociality: Working towards emergent, permanent, social affines.* Department of Computational Social Science, GMU, Fairfax, VA.

February 13, 2015 – *ALife using Adaptive, Autonomous, and Individual Agent Control.* Department of Computational Social Science, GMU, Fairfax, VA.

April 18, 2014 – *Midwife: CPU Cluster Load Distribution of Virtual Agent AIs.* Department of Computational Social Science, GMU, VA.

November 13, 2009 – *In search of the roots of social complexity.* Department of Computational Social Science, GMU, Fairfax, VA.

AWARDS

Winner best paper award at the 2015 Australian Conference on Artificial Life and Computational Intelligence.

- PUBLICATIONS** **Caduff, I., Krummenacher, S. & Rouly, O. (2017).** Power law distribution of language families using an agent based model. *Proceedings of the Computational Social Science Society 2017 Conference*. Santa Fe, New Mexico, USA. 19-22 October, 2017.
- Rouly, O. (2016).** Artificial Intelligence using P-Type Unorganized Machines. *The Rutherford Journal*, 5(16). Retrieved 12 September 2016, <http://dotbu.com/PHIL/> ISSN: 1177-1380.
- Rouly, O. (2015).** Towards Emergent Social Complexity. Unpublished dissertation. George Mason University, Fairfax, Virginia, USA.
- Rouly, O. (2015).** At the root of sociality: Working towards emergent, permanent, social affines. In Andrews, P., Caves, L., Doursat, R., Hickinbotham, S., Polack, F., Stepney, S., Taylor, T. & Timmis, J. (Eds.). *Proceedings of the European Conference on Artificial Life 2015*. pp. 82-89, MIT Press.
- Rouly, O. (2015).** ALife using Adaptive, Autonomous and Individual Agent Control. In Chalup, S., Blair, A. & Randall, M. (Eds.). *Proceedings of the Australian Conference on Artificial Life and Computational Intelligence (ACALCI 2015)*. University of Newcastle, Australia.
- Rouly, O. (2014).** Midwife: CPU cluster load distribution of Virtual Agent AIs. In Barolli, L and Xhafa, F. (Eds.). *Proceedings of the 8th International Conference on Complex, Intelligent, and Software Intensive Systems*, Birmingham, UK.
- Rouly, O. & Kennedy, W. (2011).** Sexually differentiated philopatry and dispersal: A demonstration of the Baldwin effect and genetic drift. *Proceedings of the Computational Social Science Society 2011 Conference*. Santa Fe, New Mexico, USA. 9-12 October, 2011.
- Hendrey, M., Rouly, O., West, J., Kennedy, W., & Axtell, R. (2010).** Abstract. Social Decision Making Processes in Tribal Afghanistan: An Agent-based Model. *Proceedings of the Computational Social Science Society 2010 Conference*. Arizona State University, Tempe, Arizona, USA. 4-6 November, 2010.
- Rouly, O. & Crooks, A. (2010).** Late Pleistocene Human Migrations: An Agent-based Modeling Approach. *Proceedings of the 3rd World Congress on Social Simulation*. University of Kassel, Kassel, Germany. 6-9 September, 2010.
- Rouly, O. & Crooks, A. (2010).** Abstract. A prototype, multi-agent system for the study of the Peopling of the Western Hemisphere. *Proceedings of the Computational Social Science Society 2010 Conference*. Arizona State University, Tempe, Arizona, USA, 4-6 November, 2010.
- Rouly, O. (2009).** *In Search of the Roots of Social Complexity*. Unpublished Manuscript. George Mason University, Fairfax, Virginia.

**PUBLICATIONS
(cont'd)**

Axtell, R. & Rouly, O. (2008). The Sports League Formation Problem: Case of the Washington Area Girls Soccer League. *Proceedings of the Second World Congress on Social Simulation*, George Mason University, Fairfax, Virginia, USA. 14-17 July, 2008.

Rouly, O. (2007). Learning automata and need-based drive reduction. In Ha, Q. & Kwok, N. (Eds.) *Proceedings of the 8th International Conference on Intelligent Technologies (InTech)*. University of Technology, Sydney, Australia.

Rouly, O. (2004). A Viewpoint on Embodied Synthetic Agency. *American Association for Artificial Intelligence Fall Symposium*. Arlington, Virginia, USA. 22-24 October, 2004.

Rouly, O. (2000). *Cybernetic intelligence: A return to complex qualitative feedback theory*. Unpublished thesis. New Mexico State University, Las Cruces, New Mexico, USA.