R. Paul Wiegand III

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Dr. Wiegand is a U.S citizen.

July 18, 2019

Degrees

Ph.D., Computer Science, George Mason University (January, 2004)
"Analysis of Cooperative Coevolutionary Algorithms"

M.S., Computer Science, University of North Carolina at Charlotte (1999)

B.S., Computer Science, Winthrop University (1994)

Experience

Interim Program Director of UCF's Modeling & Simulation graduate Program, *August 2018 – present*

Director of UCF's Advanced Research Computing Center. *August 2017 – present*

Associate Research Professor, Institute for Simulation & Training, University of Central Florida. *August 2017 – present*

Interim Program Director of UCF's Modeling & Simulation graduate Program, *June 2014 – August 2015*

Associate Director of UCF's Modeling & Simulation graduate Program, *September 2014 – June 2014*

Co-Manager of Higher Performance Computing resources at UCF's Advance Research Computing Center. *March 2015 – August 2017*

Joint secondary appointment in Department of Electrical Engineering & Computer Science *April 2011 – present*

Assistant Research Professor, Institute for Simulation & Training, Univ. of Central Florida. *April 2011 – August 2017*

Research Associate, Institute for Simulation & Training, University of Central Florida. *June 2007 – April 2011*

Secondary joint faculty appointment with Department of Electrical Engineering & Computer Science. *2008 – present*

Scientific research consultant, ITT Advanced Engineering & Sciences (contracted to the Naval Research Laboratory). *November 2005 – May 2007*

Adjunct faculty, Dept. of Computer Science at George Mason University. *Spring semester 2006, Fall semester 2002*

Postdoctoral fellowship, American Society of Engineering (served at the Naval Research Laboratory). *March 2004 – November 2005*

Graduate research assistant, Department of Computer Science at George Mason Univ. *September 1999 – March 2004*

Adjunct faculty (Data Structures & Algorithm Analysis), Department of Computer Science at George Mason University. *Fall semester 2002*

Part-time instructor, Central Piedmont Community College. *Spring 1999*

On-going trainer/educational resource (C++, Delphi, Object-Oriented Methodology), TrustMark, Inc. *August 1995 – August 1999*

Professional IT developer & consultant, Entity Systems & Programming, and TrustMark Inc. *May 1993 – August 1999*

Part-time student instructor (Introduction to C), Department of Computer Science at Winthrop University. *Spring Semester 1994*

Research Interests

General topics: high performance computing, algorithm analysis, coadaptive systems, coevolution, evolutionary computation, evolutionary robotics, machine learning, natural computation

Key specific topics: analysis of coadaptive systems for optimization and machine learning, theory and dynamics of coevolutionary systems, adaptive multiagent team reconfiguration and role assignment, runtime analysis of randomized algorithms

Postdoctoral Work

Supervisor: Kenneth A. De Jong, Group: Natural Computation group in the NCARAI at NRL (section 5514)

Activities: Contributed to research, publication, and grant-writing activities of the group; helped construct demonstrations of robotic technologies; helped coordinate student activities

Research projects: NRL research option "Coordinated Teams of Autonomous Systems", ONR projects N0001405WX20057 and N0001405WX30001 on "Adaptation to Attrition and Degradations in Teams of Unmanned Vehicles"

Funded Research Activities

Total funding to UCF: $2.2M By credit split: $1.3M

Awarded: "Virtualizable Rendering Resources to Support the Army Integrated Training Environment and the Future Synthetic Training Environment" (Co-PI, $241K, UCF Army Research Office)

Completed: "Education-Focused GPU Cluster" (Co-PI, $266K, UCF Internal Technology Fee, contrib.: 50%)

Completed: "Enhancing the Integrated Training Environment (ITE)" (Co-PI, $555K, US ARL via Battelle, contrib.: 20%)

Completed: "Scalable scaffolding of novice programmersÕ learning and automated analysis of their online activities" (PI, $60K, NSF, contrib.: 100%)

Completed: "CC*IIE Engineer: Bridging IT and Research Computing at UCF" (PI, $400K, NSF, contrib.: 100%)

Completed: "Persistent Virtual Worlds for Simulation-based Training" (Co-PI, $1.7M, incremental $249K awarded to-date, US Army STTC, contrib.: 25%)

Completed: "CC-NIE Networking Infrastructure: Developing a Dedicated Research Network Infrastructure at the University of Central Florida" (PI, $314K, NSF, contrib.: 50%)

Completed: "Biologically Inspired Approaches for Reasoning on Complex Functional Networks (follow-on)" (PI, $147K, NGA via University of Wyoming, contrib.: 100%)

Completed: "Biologically Inspired Approaches for Reasoning on Complex Functional Networks" (PI, $50K, NGA via University of Wyoming, contrib.: 100%)

Completed: "Multicore Model Advancement Principles Demonstrated on STOKES" (PI, $55K US ARL, contrib.: 100%)

Completed: "The Central Florida MOSAIC Interface, Stage II" (Co-PI, $50K, UCF, contrib.: 5%)

Completed: "High Performance Computing Benchmark Suite" (PI, $125K, NASA/JPL via Intelligent Automation, Inc., contrib.: 60%)

Completed: "Learning robust behaviors in mixed-agent, heterogeneous teams" project in *Team Performance in Human-Agent Collaboration*, (PI, $55K, US ARL, contrib.: 100%)

Completed: "Architecture to Support Interactive Training Simulation on Stokes HPC" (PI, $5K, US ARL via Intelligent Automation, Inc., contrib.: 100%)

Service Activities

Member of the Modeling & Simulation curriculum committee (2013 – present)

Member of the Modeling & Simulation admissions committee (2014 – 2018)

Chair for UCF's *UCF Future Directions of Research Computing Committee* (2016)

Local arrangements coordinator for the Orlando *Southern Partnership in Advanced Networking* workshop (2016)

Faculty sponsor of the *Go Club* at UCF (on-going)

Organizer of the High Performance Computing Users Group of Orlando (HUGO, 2014–2016)

Interim director of the Modeling & Simulation program (2014/2015)

Associate director of the Modeling & Simulation program (2014)

Chair of UCF's University Research Council (2014/2015)

Member of UCF's University Research Council (2011–present)

Faculty sponsor of the *Algorithms & Theory* student group (2010–2011)

Co-organizer of the Tenth Foundations of Genetic Algorithms (FOGA-2009, ACM)

Co-organizer of the "Introductory Tutorial on Coevolution" (2007 & 2008) and "Advanced Tutorial on Coevolution" (2006) at the Genetic and Evolutionary Computation Conference (GECCO)

Co-organizer of the "Coevolution Tutorial" (2005) at the Congress on Evolutionary Computation (CEC)

Co-moderator of the Evolutionary Computation Digest. *January 2001 – March 2005*

Co-chair of local arrangements for the 2005 Genetic and Evolutionary Computation Conference (2GECCO-2005, ACM)

Co-chair of the "Coevolution and Coadaptive Systems Workshop" at the 2005 AAAI Fall Symposium

Co-organizer of the first "Discussion Forum on Coevolution" (GECCO 2005) and "Understanding Coevolution Workshop" (GECCO 2002)

Co-organized summer lecture series on advanced topics in evolutionary computation. *Summer, 2002*

Co-organized "Workshop on Coevolution" at GECCO 2002

Reviewer for: *Evolutionary Computation Journal*, *Journal of Artificial Intelligence Research*, *IEEE Transactions on Systems, Man, and Cybernetics*, *IEEE Transactions on Evolutionary Computation*, *Journal of Theoretical Computer Science*, and *Algorithmica*

Academic Activities

Co-Director: Joint Evolutionary Computation / Natural Computation & Coadaptive Systems labs at UCF (2007–present)

Co-Director: *Algorithms & Theory Group*, a graduate student group in EECS at UCF (2008–2013)

Courses taught:

- *Mathematical Foundations of Modeling & Simulation* (2019 – present, M&S Program UCF)
- *An Interdisciplinary Approach to Data Visualization* (2015 – present, M&S Program UCF)
- *Data Visualization* (2018, Business Analytics Program, UCF)
- *Quantitative Aspects of Modeling & Simulation* (2011 – 2018, M&S Program UCF)
- *Machine Learning* (2007, 2009–2013, CS Program UCF)
- *Data Structures & Algorithm Analysis* (Spring 2002 & Fall 2006, CS Program GMU)
- *Introduction to Programming, Java* (Spring 1999, CPCC)
- Various *Independent Study*, *Thesis*, & *Dissertation*

Advised & Graduated:

- Avonie Parchment (Ph.D., Modeling & Simulation, 2018)
- Jeff (Phillip) Hanes (Ph.D., Modeling & Simulation, 2018)
- Oddny Brun (M.S., Modeling & Simulation, 2017)
- Sean Mondesire (Ph.D., EECS, 2014)
- Joshua Haley (Undergraduate HIM, EECS, 2014)
- Gautham Anil (Ph.D., EECS, 2012)

Currently advising:

- Armando Fandango (Ph.D., Modeling & Simulation, candidate)
- Oddny Brun (Ph.D., Modeling & Simulation)
- Rachael Straney (Ph.D., Modeling & Simulation)
- Allison Gadd (Ph.D., Modeling & Simulation)
- Lauren Doocy (co-advising w/ Joe Kider, Ph.D., Modeling & Simulation)

Thesis & dissertation committee service (graduated):

- Myungho Lee (Ph.D., Modeling & Simulation, 2019)
- Salam Daher (Ph.D., Modeling & Simulation, 2018)
- Charles Trim (Masters, Modeling & Simulation, 2018)
- Lisa Soros (Ph.D., Computer Science, 2018)
- Matthew Hackett (Ph.D., Modeling & Simulation, 2018)
- William Rivera (Ph.D., Modeling & Simulation, 2015)
- Ryan Kasha (Ph.D., Modeling & Simulation, 2015)
- Travis Wiltshire (Ph.D, Modeling & Simulation, 2015)
- Shawn Chu-Quinn (M.S., Modeling & Simulation, 2015)
- Bryan Wilder (Undergraduate HIM, EECS, 2015)
- Chris Hollander (Ph.D, Modeling & Simulation, 2015)
- Charles Harris (Ph.D., Modeling & Simulation, 2014)
- Cassondra Puklavage (M.S., EECS, 2013)
- John Barry (M.S., Modeling & Simulation, 2013)
- Sebastian Risi (Ph.D., EECS, 2012)
- Syed Mohammed (Ph.D., Modeling & Simulation, 2012)
- David D'Ambrosio (Ph.D., EECS, 2011)
- Benito Graniela (Ph.D., Modeling & Simulation, 2011)
- Omar Thompson (Ph.D., Modeling & Simulation, 2011)
- Mohamed Abdel-Raheem (Ph.D., Civil Engineering, 2011)
- Joel Lehman (Ph.D., EECS, 2010)
- Jason Gauci (Ph.D., EECS, 2010)
- Aniket Vartak (Ph.D., EECS, 2010)
- Erin Hastings (Ph.D., EECS, 2009)
- Ahmed Bakhsh (Ph.D., Industrial Engineering, 2009)

Awards and Invitations

McKnight Foundation's *William R. Jones Outstanding Mentor* award (2014)

Invited collaborative participant of Dagstuhl "Theory of Evolutionary Algorithms" seminars (2004, 2006, 2008 & 2010)

Invited talk at the UCF *EECS Seminar Series* (2009)

Invited researcher for the Collaborative Research Center on "Computational Intelligence" at Universität Dortmund. (*February 17 – April 13, 2003*)

Key Journal Publications and Book Chapters

Doocy, L., Prager, S., Kider, J., & **Wiegand, R.P.**. (to appear) "Robust Path Matching and Anomalous Route Detection Using Posterior Weighted Graphs." *ACM Transactions on Spatial Algorithms and Systems*. *[New journal, accept rate 11%]*

Hanes, J. and **Wiegand, R.P.** (to appear). "Analytical and Evolutionary Methods for Finding Cut Volumes in Fault Trees Constrained by Location." *IEEE Transactions on Reliability*. [Journal Impact Factor: 2.790]

Bari, G., Gaspar, A., **Wiegand, R.P.**, Albert, J., Bucci, A., and Kumar, A. (2019). "Evolutionary Parsons Puzzles: Design Implementation & Preliminary Evaluation." *IEEE Transactions on Learning Technologies*. [Journal Impact Factor: 2.267]

Giroux, A.L., Harper, C., **Wiegand, R.P.** (2018). "Evaluating Multi-criteria Connection Mechanisms: a new algorithm for browsing digital archives." In *Digital Scholarship in the Humanities*, volume 33 (3).

Prager, S. & **Wiegand, R.P.** (2013) "Modeling Use of Space from Social Media Data Using a Biased Random Walker". *Transactions in GIS*, DOI: 10.1111/tgis.12069. [Journal Impact Factor: 1.298]

Wiegand, R.P. & Christopher Ellis (2012) "Physicomimetic Swarm Design Considerations: Modularity, Scalability, Heterogeneity, and the Prediction vs Control Dilemma." Chapter in *Physicomimetics: Physics-Based Swarm Intelligence* (Springer)

Wiegand, R.P. (2011) "Coevolutionary Learning". Chapter in *Encyclopedia of Machine Learning* (Springer).

Popvici, E., Bucci, A., **Wiegand, R.P.**, & de Jong, E.E. (2010) "Coevolutionary Principles". Chapter in *Natural Computation Handbook* (Springer).

Panait, L., Luke, S., & **Wiegand, R.P.** (2006) "Biasing Coevolutionary Search for Optimal Multiagent Behaviors." *IEEE Transactions on Evolutionary Computation* 10(6). [Journal Impact Factor: 5.545]

Jansen, T. & **Wiegand, R.P.** (2004) "The Cooperative Coevolutionary (1+1) EA." *Evolutionary Computation*, 12(4). [Journal Impact Factor: 3.103]

FOGA Publications

Foundations of Genetic Algorithms is the leading venue for publishing work related the theory of evolutionary computation and is considered a near journal-level quality publication within the field of *Evolutionary Computation*.

Anil, G. & **Wiegand, R.P.** (2009) "Black-box search by elimination of fitness functions." In *Foundations of Genetic Algorithms X*.

Wiegand, R.P., Liles, W., & De Jong, K. (2002) "Modeling Variation in Cooperative Coevolution Using Evolutionary Game Theory." In *Foundations of Genetic Algorithms VII*.

Luke, S. & **Wiegand, R.P.** (2002) "Guaranteeing Coevolutionary Objective Measures." In *Foundations of Genetic Algorithms VII*.

Other Refereed Publications

Bari, G., Gaspar, A., **Wiegand, R.P.** (2018). "Selection Methods to Relax Strict Acceptance Condition in test-based Coevolution." In *Proceedings of the 2018 Congress on Evolutionary Computation*. [Conference acceptance rate $\approx$ 60%%]

Fandango, A. & **Wiegand, R.P.** (2018). "Towards investigation of iterative strategy for data mining of short-term traffic flow with Recurrent Neural Networks". In *Proceedings of the* 2^{nd} *ACM International Conference on Information System and Data Mining*. *[Acceptance rate unknown]*

Gaspar, A., Bari, G., Kumar, A., Bucci, A., **Wiegand, R.P.**, and Albert, J. (2017) "Evolutionary Practice Problems Generation: More Design Guidelines." In *Proceedings of the* 29^{th} *International Florida Artificial Intelligence Symposium*. [Conference acceptance rate $\approx$ 57%]

Caulkins, B. Goldiez, B.F. **Wiegand, R.P.**, Martin, G. Dumanoir, P., & Torres, T. (2017) "Emerging Network and Architecture Technology Enhancements to Support Future Training Environments." In *Proceedings of the 2017 Interservice/Industry Training, Simulation, and Education Conference*.

Gaspar, A., Bari, G., Kumar, A., Bucci, A., **Wiegand, R.P.**, and Albert, J. (2016) "Evolutionary Practice Problems Generation: Design Guidelines." In *Proceedings of the IEEE* 28^{th} *International on Tools with Artificial Intelligence*. [Conference acceptance rate $\approx$ 31%]

Wiegand, R.P., Bucci, A., Kumar, A., Albert, J., Gaspar, A. (2016). "A Data-Driven Analysis of Informatively Hard Concepts in Introductory Programming." In *Proceedings of the* 47^{th} *ACM Technical Symposium on Computer Science Education*. [Conference acceptance rate $\approx$ 35%]

Bucci, A., **Wiegand, R.P.**, Kumar, A., Albert, J., Gaspar, A. (2016). "Effectiveness of Dimension Extraction Methods for Student-Problem Performance Analysis." In *Proceedings of the* 28^{th} *International Florida Artificial Intelligence Symposium*. [Conference acceptance rate $\approx$ 57%]

Hanes, J., **Wiegand, R.P.** (2016). "Using L-Systems to Generate Fault Trees for Benchmarking & Testing." In *Proceedings of the* 28^{th} *International Florida Artificial Intelligence Symposium*. [Conference acceptance rate $\approx$ 57%]

Wu, A.S., **Wiegand, R.P.**, Pradhan, R., (2016). "Diversity in Top-N Recommendations via Probabilistic Selection of Neighbors in Collaborative Recommender Systems". In In *Proceedings of the* 28^{th} *International Florida Artificial Intelligence Symposium*. [Conference acceptance rate $\approx$ 57%]

Mondesire, S. and **Wiegand, R.P.** (2014) "Forgetting Beneficial Knowledge in Decomposition-Based Reinforcement Learning Using Evolutionary Computation". In Proceedings of the 2014 International Conference on Genetic and Evolutionary Methods. [Conference acceptance rate $\approx$ 65%]

Wiegand, R.P. & Prager, S. (2013) "Simple Methods for Reasoning about Behavior Patterns on Graphs Given Extremely Sparse Observations". In *The* 5^{th} *International Conference on Advanced Geographic Information Systems, Applications, and Services*. [Conference acceptance rate $\approx$ 29%]

Mondesire, S. & **Wiegand, R.P.** (2013) "Forgetting Classification and Measurement for Decomposition-based Reinforcement Learning". In *Proceedings of The* 15^{th} *International Conference on Artificial Intelligence*. [Conference acceptance rate $\approx$ 25%]

Mondesire, S. & **Wiegand, R.P.** (2011) "Evolving a non-playable character team with layered learning." In *Proceedings of IEEE Symposium on Computational Intelligence in Multi-criteria Decision-Making*.

Anil, G. & **Wiegand, R.P.** (2011) "Domain Specific Analysis and Modeling of Optimal Elimination of Fitness Functions with Optimal Sampling." In *Proceedings of the 2011 Genetic and Evolutionary Computation Conference*. [Conference acceptance rate $\approx$ 38%]

Ghosh, C., **Wiegand, R.P.**, Goldiez, B., & Dere, T. (2010) "An Architecture Supporting Large Scale MMOGs." In *Proceedings of the 2010 Distributed Simulation & On-Line Gaming Conference.*

Wiegand, R.P., Anil, G., Garibay, I., Garibay, O., & Wu, An. (2009) "On the Performance Effects of Unbiased Module Encapsulation." In *Proceedings for the 2009 Genetic and Evolutionary Computation Conference*. [Conference acceptance rate $\approx$ 41%]

Ellis, C. & **Wiegand, R.P.** (2008) "Actuation Constraints and Artificial Physics Control." In Proceedings from the Tenth International Conference on Parallel Problem Solving from Nature. [Conference acceptance rate $\approx$ 55%]

Wiegand, R.P., Potter, M., Sofge, D., & Spears, W. (2006) "A Generalized Graph-Based Method for Engineering Swarm Solutions to Multiagent Problems." In *Proceedings for the Ninth International Conference on Parallel Problem Solving from Nature*. [Conference acceptance rate $\approx$ 42%]

Wiegand, R.P. & Potter, M. (2006) "Robustness in Cooperative Coevolution." In *Proceedings from the 2006 Genetic and Evolutionary Computation Conference*. [Conference acceptance rate $\approx$ 46%]

Jansen, T. & **Wiegand, R.P.** (2004) "Bridging the Gap Between Theory and Practice." In *Proceedings from the Eighth International Conference on Parallel Problem Solving from Nature*. [Conference acceptance rate $\approx$ 33%]

Panait, L, **Wiegand, R.P.**, & Luke, S. (2003) "Improving Coevolutionary Search for Optimal Multiagent Behaviors." In *Proceedings of the* 18^{th} *International Joint Conference on Artificial Intelligence*. [Conference acceptance rate ≈ 21%]

Potter, M., **Wiegand, R.P.**, Blumenthal, J., & Sofge, D. (2005) "Effects of Experience Bias When Seeding With Prior Results." In *Proceedings from the 2005 Congress of Evolutionary Computation*. [Conference acceptance rate ≈ 57%]

Panait, L., **Wiegand, R.P.**, & Luke S. (2004) "A Visual Demonstration of Convergence Properties of Cooperative Coevolution." In *Proceedings from the Eighth International Conference on Parallel Problem Solving from Nature*. [Conference acceptance rate ≈ 33%]

Panait, L., **Wiegand, R.P.**, & Luke S. (2004) "A Sensitivity Analysis of a Cooperative Coevolutionary Algorithm Biased for Optimization." In *Proceedings from the 2004 Genetic and Evolutionary Computation Conference*. [Conference acceptance rate ≈ 50%]

Wiegand, R.P. & Sarma, J. (2004) "Spatial Embedding and Loss of Gradient in Cooperative Coevolutionary Algorithms." In *Proceedings from the Eighth International Conference on Parallel Problem Solving from Nature*. [Conference acceptance rate ≈ 33%]

Jansen, T. & **Wiegand, R.P.**, (2003) "Sequential versus Parallel Cooperative Coevolutionary (1+1) EAs." In *Proceedings of the 2003 Congress on Evolutionary Computation*. [Conference acceptance rate ≈ 65%]

Jansen, T. & **Wiegand, R.P.** (2003) "Exploring the Explorative Advantage of the CC (1+1) EA." In *Proceedings of the 2003 Genetic and Evolutionary Computation Conference*. [Conference acceptance rate ≈ 47%]

Wiegand, R.P., Liles, W., & De Jong, K. (2002) "The Effects of Representational Bias on Collaboration Methods in Cooperative Coevolution." In *Proceedings of the Seventh Conference on Parallel Problem Solving from Nature*. [Conference acceptance rate ≈ 50%]

Wiegand, R.P., Liles, W., & De Jong, K. (2002) "Analyzing Cooperative Coevolution with Evolutionary Game Theory." In *Proceedings for the 2002 Congress on Evolutionary Computation*. [Conference acceptance rate ≈ 47%]

Wiegand, R.P. (1998) "Applying Diffusion to a Cooperative Coevolutionary Model". In *Proceedings of Parallel Problem Solving fron Nature V* [Conference acceptance rate ≈ 54%]

Dissertation and Thesis

Wiegand, R.P. (2004) "Analysis of Cooperative Coevolutionary Algorithms." Ph.D. thesis, George Mason University.

Wiegand, R.P. (1999) "A Mutatable Tagging Scheme for Cooperative Coevolutionary Algorithms", Masters Thesis, University of North Carolina Charlotte.