Kagan Tumer

Professor
Oregon State University
Director, Collaborative Robotics and Intelligent Systems (CoRIS) Institute
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http://engr.oregonstate.edu/~ktumer

RESEARCH FOCUS:

Autonomy, learning, and optimization in robots and real-world systems:
>   Multiagent Learning: Who learns what?
>   General Artificial Intelligence: What matters when?
>   Long-term learning and teaming: What behavior supports future intent?
>   Societal impact of AI and robotics: What is the role of AI and robotics in society?

Applications include:
>   Autonomous Robot Control and Multi-Robot Coordination
>   Air Traffic Management
>   Advanced Power Plant Control
>   Creativity and Optimization in Product Design

EDUCATION:

The University of Texas, Austin, Texas

Ph.D., Electrical and Computer Engineering, May 1996.
Dissertation title: *Linear and Order Statistics Combiners for Reliable Pattern Recognition*
Advisor: Prof. Joydeep Ghosh

M.S., Electrical and Computer Engineering, August, 1992.
Thesis title: *Structural Adaptation and Generalization in Neural Networks*

George Mason University, Fairfax, Virginia

B.S. (with distinction), Electrical Engineering, May, 1989.

PROFESSIONAL EXPERIENCE:

Oregon State University, Corvallis, OR.   September 2006 - Present
Director, Collaborative Robotics and Intelligent Systems (CoRIS) Institute.   June 2017 - Present
Director, Robotics Graduate Program.   September 2015 - June 2017
Professor, Robotics. School of Mechanical Industrial and Manufacturing Engr.   June 2010 - Present
Associate Professor, Dynamics and Control.   September 2006-June 2010

Zebigo.com, Spokane, WA.   May 2008 - 2012
Chief Scientist. Directed system architecture and algorithms for intelligent logistics and transportation.

NASA Ames Research Center, Moffett Field, CA.   September 1999 - September 2006
Senior Research Scientist/Group Lead, Intelligent Systems Division.
Formed and led group on control and coordination in complex systems.
Performed research on machine learning, multiagent systems and control of complex systems.
Planned program activities for applying AI techniques to spacecraft systems/air transportation systems.

Caelum Research Corp, NASA Ames Res Ctr, Moffett Field, CA.   July 1997 - September 1999
Research Scientist, Intelligent Systems Division.
Performed research on machine learning, multiagent systems and control of complex systems.

The University of Texas, San Antonio, TX.   September 1996 - June 1997
Visiting Assistant Professor, Division of Engineering.

The University of Texas, Austin, TX.   September 1992 - May 1997
Research Associate, Laboratory for Artificial Neural Systems, (September 1996 - June 1997).
Graduate Research/Teaching Assistant, Department of Electrical and Computer Engineering.

Tracor Inc., Austin, TX.   June - August 1992
Engineer, Research and Development: Explored classifier combining strategies.

Halliburton Logging Services, Austin, TX.   November 1989 - September 1991
Engineer, Austin Research Center: Developed models for correcting borehole instrument readings.

CONSULTING:

Google Inc.   May 2018 - Present
SGT Inc., NASA Ames Research Center   2012 ; 2013 ; 2015
Orbital Sciences Corporation   March - July 2013
RIACS, NASA Ames Research Center   June-September 2008
Halliburton Logging Services   March-September 1993

PATENT:

Spectroscopic detection of cervical pre-cancer using radial basis function networks. US patent
no. 6,135,965 (Oct. 2000). Inventors: K. Tumer, N. Ramanujam, R. Richards-Kortum and J. Ghosh.

AWARDS:

- **Nomination for Best Paper Award:** "Evolving Memory-Augmented Neural Architectures for Deep Memory Problems," S. Khadka, J. J. Chung, and K. Tumer. *Proceedings of Genetic and Evolutionary Computation Conference (GECCO)*, Berlin, Germany, July 2017.

- **Best Real World Application Paper Award:** "Evolving Large Scale UAV Communication Systems," A. Agogino, C. Holmes-Parker and K. Tumer. *Proceedings of the Genetic and Evolutionary Computation Conference*. Philadelphia, PA, July 2012.

- **Best Paper Award:** "Distributed Agent-Based Air Traffic Flow Management," K. Tumer and A. Agogino. *Sixth international conference on* **"Autonomous Agents and MultiAgent Systems,** May 2007. (Best paper out of 531 submissions).

- **Nomination for Best Real World Applications Paper Award:** "Robust Neuro-Control for A Micro Quadrotor," J. Shepherd III and K. Tumer. *The Genetic and Evolutionary Computation Conference*, Portland OR, July 2010.

- **Nomination for Best Real World Applications Paper Award:** "A Neuro-Evolutionary Approach to Micro Aerial Vehicle Control.," M. Salichon and K. Tumer. *The Genetic and Evolutionary Computation Conference*, Portland OR, July 2010.

- 1st Runner up for **Best Theoretical Development Paper Award:** "Fast Multiagent Learning: Cashing in on Team Knowledge." N. Khani and K. Tumer. In *18th International Conference on Artificial Neural Networks in Engineering,* St. Louis, MO, November 2008.

- 2nd Runner up for **Best Application Paper Award:** "Neuro-Evolutionary Navigation for Resource-Limited Mobile Robots," M. Knudson and K. Tumer In *18th International Conference on Artificial Neural Networks in Engineering,* St. Louis, MO, November 2008.

FUNDED PROPOSALS:

Oregon State University (2007 to present):

Total Funding:	**$ 7.34 M**
K. Tumer's Share:	**$ 5.27 M**

24. **Kagan Tumer (PI)**, "Coordination in tightly coupled domains: Stepping stone rewards to induce the correct joint actions," **National Science Foundation** (IIS, Robust Intelligence), September 2018–September 2021.

23. **Kagan Tumer (PI)**, "Multi-Reward Learning: A New Paradigm for Robust and Assured Autonomy," **National Aeronautics and Space Administration**, September 2018–September 2020.

22. **Kagan Tumer (PI)**, "Multi-Objective Neuroevolutionary Control," **Electric Power Research Institute**, January 2018–December 2019.

21. Bill Smart (PI), **Kagan Tumer**, and Geoff Hollinger , "JMPS Automated Planning," **Navy/NAVAIR**, December 2016–December 2017.

20. Bill Smart (PI), **Kagan Tumer**, and Geoff Hollinger , "Roadmap for NAVAIR," **Navy/NAVAIR**, March 2016–March 2017.

19. **Kagan Tumer (PI)**, Ross Hatton, and Yigit Menguc, "Materials, Mechanics and Algorithms for Plug and Play Robotics," **Hewlett-Packard Company**, August 2016–August 2017.

18. **Kagan Tumer (PI)** and Geoffrey Hollinger, "Typecasting Agents for Managing Human-System Interactions in the NAS," **National Aeronautics and Space Administration**, Authority and Autonomy: Safety Analysis of Multiple Human-System Interactions in the NAS, June 2014–June 2017.

17. Irem Tumer (PI), **Kagan Tumer** and Chris Hoyle, "Designing Complex Engineering Systems using Multiagent Coordination Approaches," **NSF** (CMMI, Engineering Design and Innovation), August 2014–July 2016.

16. Geoff Hollinger (PI), **Kagan Tumer**, and Bill Smart, "Complex System Planning to Improve Global Product Flow," **PCC Structurals Inc. / Oregon Metal Initiative**, June 2014–July 2016.

15. **Kagan Tumer (PI)**, "Evolving Robust and Reconfigurable Multi-objective Controllers for Advanced Power Systems" **National Energy Technology Laboratory**, Crosscutting Research: Development of Novel Architectures for Optimization of Advanced Energy Systems, October 2013–October 2017.

14. **Kagan Tumer (PI)**, "Intelligent Coordination of Heterogeneous Sensors in Advanced Power Systems" **National Energy Technology Laboratory**, Support of Advanced Coal Research at US Colleges and Universities Program, October 2013–March 2015.

13. **Kagan Tumer (PI)**, "Distributed Sensor Coordination for Advanced Energy Systems (Extension)," **U.S. Department of Energy**, Fundamental Developments in Sensors and Controls for Power and Fuel Systems Program, November 2012–July 2013.

12. **Kagan Tumer (PI)**, "Intelligent Optimization of SuperTruck Routing and Fleet Operation," **Daimler Trucks, North America** (As a subcontractor on DOE proposal; funds include Oregon Metal Initiative cost share). June 2010–May 2013.

11. Tom Dietterich (PI), Alan Fern, Prasad Tadepalli, **Kagan Tumer**, Weng-Keen Wong, "A compute cluster and software tools for Monte-Carlo methods in artificial intelligence," **NSF** (CNS, Computing Research Infrastructure), July 2010–July 2013.

10. **Kagan Tumer (PI)**, "Distributed Sensor Coordination for Advanced Energy Systems," **U.S. Department of Energy**, Fundamental Developments in Sensors and Controls for Power and Fuel Systems Program, November 2009–October 2012.

9. **Kagan Tumer (PI)**, "Distributed Coordination of Agents for Air Traffic Flow Management," **NSF** (CNS, Cyber-Physical Systems), September 2009–September 2012,.

8. Irem Tumer (PI), **Kagan Tumer** and Rob Stone, "Quantifying Creativity in Automated Design through a Multiagent Coordination Framework," **NSF** (CMMI, Engineering Design and Innovation), July 2009–July 2012.

7. Ted Brekken (PI), Alex Yokochi, **Kagan Tumer** and Annette Von Jouanne, "Direct Drive Wave Energy Buoys," **U.S. Department of Energy**, Advanced Water Power Program (with Columbia Power Technologies LLC), October 2009–October 2011.

6. **Kagan Tumer (PI)**, "Coordinating Learning Agents for Active Information Collection," **Air Force Office of Scientific Research** (AFOSR, Distributed Intelligence). April 2008–March 2011.

5. **Kagan Tumer (PI)**, "Foundations of Multiagent Control in Complex Environments," **NSF** (IIS, Robust Intelligence), March 2009–September 2010.

4. **Kagan Tumer (PI)**, "Adaptive Methods for Robust Commercial Vehicle Control, Routing and Operation," **Daimler Trucks North America**. September 2008–May 2010.

3. **Kagan Tumer (PI)**, "Robust Commercial Vehicle Control, Routing and Operation," **Oregon Metal Initiative**, September 2008–May 2009.

2. **Kagan Tumer (PI)**, "Autonomous Vehicle Testing Platform," Certificate of Participation Fund, College of Engineering, Oregon University System, Fall 2008.

1. **Kagan Tumer (PI)**,"Small Robots and Artificial Terrain," The William and Flora Hewlett Foundation, Engineering Schools of the West initiative, Mini-grant, Fall 2007.

NASA Ames Research Center (1999 to 2006):

                Total Funding: **$ 3.4 M**

7. **Kagan Tumer (PI)**, "Complex Interaction Discovery," *Concepts and Tools Program,* NASA, 2005. In *System Reasoning and Risk Management* Program.

6. **Kagan Tumer (PI)**, "Complex Systems Research," *Engineering Complex Systems Program,* NASA, 2004.

5. David Wolpert (PI) and **Kagan Tumer**, "Self-Dissimilarity: An empirical measure of complexity," *Director's Discretionary Funding*, NASA Ames Research Center. 2002-2003.

4. David Wolpert (PI) and **Kagan Tumer**, "Artificial Collective Intelligence," *Intelligent Systems Program*, NASA, directed funding, 2002-2003.

3. David Wolpert (PI) and **Kagan Tumer**, "Artificial Collective Intelligence," *Thinking Systems Program* (NRA-632), NASA, 1999-2001.

2. Paul Stolorz (PI), F. Carsey, Eric Mjolness, Kagan Tumer, David Wolpert. "Science Directed Autonomy for Astrobiology Missions." *Thinking Systems Program*, (NRA-632), NASA, 1999.

1. Michael New (PI), **Kagan Tumer**, Charles Blackwell. "Fundamental Properties of Autocatalytic Systems," *Computational Astrobiology Program*, NASA, 2000-2002.

PROFESSIONAL ACTIVITIES:

Board of Directors:

International Foundation of Autonomous Agents and MultiAgent Systems (IFAAMAS) board of directors. Foundation oversees Journal, conference, award, & outreach activities. (Elected in 2016 for a 6 year term.)

Chair, Finance Committee, 2016-present.

Journal, Book Series Editorships:

Editorial Board, *Journal of Autonomous Agents and Multi-Agent Systems*, (Springer), 2010–present.

Section Editor for Computer Science, *Advances in Complex Systems* (World Scientific), 2007–2011.

Associate Editor, *Pattern Recognition Letters* (Elsevier), 2004–2007.

Guest Editor, *Information Fusion*, special issue on "Application of Ensemble Methods" (co-editor: N. Oza; Editor-in-Chief: B. V. Dasarathy; Elsevier) 2007.

Board of Associate Editors, *Complex Systems and Inter-Disciplinary Science* book series (World Scientific) 2004–2008.

Conference Organization:

Sponsorship Co-Chair for the 17th International Conference on "Autonomous Agents and MultiAgent Systems (AAMAS)," Stockholm, Sweden, July 2018.

Scholarship Chair for the 13th International Conference on "Autonomous Agents and MultiAgent Systems (AAMAS)," Paris, France, May 2014.

Program Co-Chair for the 10th International Conference on "Autonomous Agents and MultiAgent Systems (AAMAS)," Taiwan, May 2011.

Workshops Chair for the 9th International Conference on "Autonomous Agents and MultiAgent Systems (AAMAS)," Toronto, Canada, May 2010.

Co-Chair of the 19th "Artificial Neural Networks in Engineering" Conference, St. Louis, MO November 2009.

Workshop/Symposium Organization:

Co-Chair of the "Adaptive and Learning Agents (ALAg)" workshop at *AAMAS 2007*, Honolulu, HI, May 2007.

Co-Chair of the "Collectives and the Design of Complex Systems" workshop at *Stanford University*, Stanford, CA, August 2003.

Co-Chair of the "Collectives and the Design of Complex Systems" workshop at *NASA Ames Research Center*, Moffett Field, CA, August 2002.

Co-Chair of the "Distributed Learning for Optimization" special session in the *Congress on Evolutionary Computation (CEC)*, Honolulu, HI, May 2002.

Co-Chair of the "Collaborative Learning Agents" Symposium at *AAAI Spring symposium*, Stanford, CA, March 2002.

Co-Chair of the "Behavior of Collectives: Mathematical Foundations of Distributed Intelligence" workshop at *the Santa Fe Institute*, Santa Fe, NM, January 2002.

Co-Chair of the "Turnkey Algorithms for Improving Generalizers" workshop at *NIPS 1998*, Denver, CO, December 1998.

Technical Program Committees for Conference:

Multi-Robot and Multiagent Systems (MRS) Symposium, 2017.

Towards Autonomous Robotic Systems Conference (TAROS), 2015.

Autonomous Agents and Multi Agent Systems (AAMAS), Blue Sky Track, 2014, 2015.

Autonomous Agents and Multi Agent Systems (AAMAS), Demos, 2015, 2016.

American Assoc for Artificial Intelligence Conference (AAAI): 2011, 2012, 2013, 2016, 2017, 2018.

AAMAS, Robotics Track, Senior Program Committee: 2013.

AAMAS, Senior Program Committee: 2006, 2008, 2012, 2016, 2017, 2018 (Area Chair).
Intel Jt Conf on Artificial Intelligence (IJCAI): (Senior) Program Committee: 2011, 2016, 2017, 2018.
Autonomous Agents and Multi Agent Systems (AAMAS): 2004-2008.
International Conference on Machine Learning (ICML): 2003, 2007, 2008.
American Association for Artificial Intelligence Conference (AAAI), Nectar: 2007, 2008.
International Conference on Pattern Recognition (ICPR): 2006.
Genetic and Evolutionary Computation Conference (GECCO): 2006-2007.
Multiple Classifier Systems (MCS): 2001-2005.
Artificial Neural Networks in Engineering (ANNIE): 1999-2008.
International Joint Conference on Neural Networks (IJCNN): 2001-2007.

Technical Program Committees for Workshops:

Adaptive and Learning Agents (ALA) Senior steering Committee, 2009-2018.
Optimisation in Multi-Agent Systems (OPTMAS), (at AAMAS 2015), Istanbul, Turkey, May 2015.
Workshop on Synergies between Multiagent Systems, Machine Learning, and Complex Systems (TRI 2015), IJCAI-2015, Buenos Aires, July 2015.
International Joint Workshop on Optimisation in Multi-Agent Systems and Distributed Constraint Reasoning (OptMAS-DCR) (at AAMAS 2014), Paris, France, May 2014.
Adaptive and Learning Agents (ALA) (at AAMAS 2013), Minnesota, MN, May 2013.
Adaptive and Learning Agents (ALA) (at AAMAS 2012), Valencia, Spain, June 2012.
Adaptive and Learning Agents (ALA) (at AAMAS 2011), Taipei, Taiwan, May 2011.
Agents in Traffic and Transportation (at AAMAS 2010), Toronto, Canada, May 2010.
Adaptive and Learning Agents (ALA) (at AAMAS 2010), Toronto, Canada, May 2010.
Evolutionary Computation and Multi-Agent Systems and Simulation (at GECCO 2010) Portland, OR, July 2010.
Adaptive and Learning Agents (ALA) (at AAMAS 2009), Budapest, Hungary, May 2009.
Evolutionary Computation and Multi-Agent Systems and Simulation (at GECCO 2008) Atlanta, GA, July 2008.
Adaptive and Learning Agents and Multiagent Systems (ALAg+ALAMAS) (at AAMAS 2008), Estoril, Portugal, May 2008.
Agents in Traffic and Transportation (at AAMAS 2008), Estoril, Portugal, May 2008.
Evolutionary Computation and Multi-Agent Systems and Simulation (at GECCO 2007) London, UK, July 2007.
Adaptation and Learning in Agents and in Multiagent Systems (ALAMAS 2007), Maastricht, Netherlands, April 2007.
Learning and Adaptation in Multiagent Systems (at AAMAS 2005), Utrecht, Netherlands, July 2005.
Multiagent Learning (at AAAI 2005), Pittsburgh, PA, July 2005.
Learning Agents (at Autonomous Agents 2001), Montreal, CA, May 2001.
Distributed and Parallel Knowledge Discovery (at KDD-2000), Boston, MA, August 2000.

Tutorials at Conferences:

"Collective Intelligence," ANNIE 1999 tutorial, St. Louis, MO, November, 1999.
"Classifier Ensemble: How and Why They Work" (w/ Chris Merz), ANNIE 1999 tutorial, St. Louis, MO, November, 1999.

Book Reviewer:

Springer (Machine learning and AI applications)

Journal Reviewer:

Transactions of Autonomous and Adaptive Systems (ACS)
Journal of Aerospace Computing (AIAA)
IEEE Transactions on Computers (IEEE)
Information Fusion (Elsevier)

IEEE Transactions on Pattern Analysis and Machine Learning (IEEE)
IEEE Transactions on Computers (IEEE)
Machine Learning (Kluwer)
IEEE Transactions on Neural Networks (IEEE)
IEEE Transactions on Knowledge and Data Engineering (IEEE)
Pattern Analysis and Applications (Springer)
Pattern Recognition (Elsevier)
International Journal of Pattern Recognition and Artificial Intelligence (World Scientific)
International Journal of Smart Engineering System Design (Gordon and Breach)

Conference Reviewer:

International Conference on Machine Learning
American Association for Artificial Intelligence Conference
International Conference on Pattern Recognition
Genetic and Evolutionary Computation Conference
Autonomous Agents and Multi Agent Systems
International Joint Conference on Neural Networks
Autonomous Agents
Multiple Classifier Systems
Artificial Neural Networks in Engineering
International Conference on Discovery and Data Mining
Australian Conference on Neural Networks

Proposal/Award Referee:

National Science Foundation panel on Computer and Information Science & Engineering (CISE) 2012.
National Science Foundation panel on Computer and Information Science & Engineering (CISE) 2010.
AFOSR reviewer for Mathematics, Information and Life Sciences program, 2009.
National Science Foundation panel on Computer and Information Science & Engineering (CISE) 2008.
National Science Foundation reviewer for Division of Ocean Sciences (OCE), 2008
AFOSR reviewer for Mathematics, Information and Life Sciences program, 2009.
National Science Foundation panel on Computer and Information Science & Engineering (CISE) 2007.
"Director's Discretionary Funding" proposals. (Select 10 out of 35-50 cross-disciplinary
	proposals to promote innovative, high risk research). 2000-2005
SBIR and STTR proposals to NASA. 2001,2002, 2005.
"H. Julian Allen award" (Best paper by a NASA Ames scientist). 2000-2005.
"Associate Ames Fellow award" (Recognize body of work by an Ames scientist). 2000-2005.
"RIACS Summer Student Research Program" (Select 10 students a year out of 60-80 applicants.
	for summer research positions in Computational Sciences Division). 2000, 2001, 2002.
"Graduate Student Research Program" (Select 6 students a year out of over 30 applicants
	to work at NASA Ames Research Center). 2000-2004.
"Best Application Paper," *ANNIE 1999*, St. Louis, MO, November 1999.
"Best Theoretical Paper," *ANNIE 1998*, St. Louis, MO, November 1998.

Professional and Honor Society Affiliations:

Senior Member of *The Institute of Electrical and Electronics Engineers*.
Life Member of *American Association of Artificial Intelligence*.
Member of *Eta Kappa Nu Electrical Engineering Honor Society* (1988).
Member of *Alpha Chi National Honor Society* (1987).

Committee Service at Oregon State University

Chair, Mid-Tenure Sub-Committee, Nordica MacCarty, School of MIME. Winter 2018.
Promotion and Tenure Sub-Committee, Ross Hatton, School of MIME. Fall 2017.
Chair, Promotion and Tenure Committee, Brady Gibbons, School of MIME. Fall 2017.

Robotics Graduate Program Committee. School of MIME. Sept 2016-present.
MIME Associated Head Search Committee. School of MIME. Winter-Spring 2017.
Mid-Tenure Sub-Committee, Yigit Menguc, School of MIME. Winter 2017.
Co-chair, Robotics Faculty Search Committee. College of Engineering. Fall 2016-Spring 2017.
Chair, Promotion and Tenure Sub-Committee & Committee, Bill Smart, School of MIME. Fall 2016.
Faculty Search Committee. School of EECS. Fall 2014-Spring 2015.
Ad-Hoc Committee of "Who votes for what?" School of MIME. Winter-Spring 2015.
Chair, Mid-Tenure Sub-Committee, Ross Hatton, School of MIME. Winter 2015.
Chair, Mid-Tenure Sub-Committee, Ravi Balasubramanian, School of MIME. Winter 2015.
Faculty Search Committee. School of MIIME. Fall 2013-Spring 2014. Hired one Robotics faculty.
Faculty Search Committee. School of MIME. Fall 2012-Spring 2013. Hired one Robotics faculty.
Lead, Robotics & Controls Area (9 Faculty) in MIME, Fall 2006-2016.
Faculty Search Committee. School of MIME. Fall 2011-Spring 2012. Hired two Robotics faculty.
Joint MIME Faculty Search Committee. School of MIME. Fall 2010-Spring 2011. Hired four faculty, one in Robotics.
ME Graduate Program Committee. School of MIME. Sept 2006-present.
Chair, ME Graduate Program Committee. School MIME. Sept 2008-June 2011.
Member, MIME Recruiting Committee, School of MIME. April 2008-Present.
Chair, Faculty Search Committee for Robotics. School of MIME. Fall 2007-Spring 2008.
Member, ME Graduate Program Committee. School of MIME. Fall 2006-May 2008. Hired one faculty.
Member, Ad Hoc Joint Committee on Graduate Admissions. Mechanical Engineering and Industrial and Manufacturing Engineering Departments. Winter/Spring 2007.

Leadership Roles at NASA Ames Research Center (1997-2006):

Group co-lead, "Sensing and Control in Distributed Adaptive Systems," Intelligent Systems Division, 2005.
Group lead, "Control and Coordination in Adaptive Systems," Intelligent Systems Division, 2003-2004. (Formed group in 2003).
Group co-lead, "Collectives," Computational Sciences Division, 2000-2003.

Project co-lead ,"Artificial Collectives," *Intelligent Systems* Program, 2000-2003.
Project lead, "Complex Systems Interaction Discovery," *Advanced Systems, Concepts and Tools* Program, 2004-2005.
Program element manager, "System Complexity Research," *Engineering and Complex Systems* Program, 2002-2004. Budget: $150,000 (2002); $250,000 (2003) ; $450,000 (2004).

Program planning: "Airspace Systems" in *Fundamental Aeronautics* Program, 2005.
Research program planning: "Bio-Info-Nano Fusion/Intelligent Matter," 2004.
NASA Ames/UCLA partnership: "Cell Mimetic Space Exploration" project, UCLA, CA, 2003.
Member, Ames Science and Technology Council, 2004-2006.
Member, Ames Basic Research Council, 2000-2004.
Technical Grant Monitor for four grants to universities (2001-2002).

EDUCATIONAL/ADVISING ACTIVITIES:
(All degrees from Oregon State University unless otherwise noted)

Post-Doctoral Researchers Supervised:

4. Jen Jen Chung, December 2014 to 2017.
3. Mitch Colby, June 2014 to March 2016.
2. Scott Proper, January 2010 to April 2012.
1. Matt Knudson, December 2009 to December 2010.

Doctoral Students Supervised:

11. Connor Yates, Robotics, in progress.

10. Golden Rockefeller, Robotics, in progress.

9. Shauharda Khadka, Robotics, in progress.

8. Carrie Rebhuhn, "Adaptive Multiagent Traffic Management for Autonomous Robotic Systems," Robotics, June 2017.

7. Logan Yliniemi, "Multi-Objective Optimization in Multiagent Systems," Robotics/Mechanical Engineering, June 2015 (co-advised with Chris Hoyle).

6. Atil Iscen, "Multiagent Learning for Locomotion and Coordination in Tensegrity Robotics," Computer Science/Mechanical Engineering, June 2014 (co-advised with Geoff Hollinger).

5. Mitch Colby, "Theoretical and Implementation Concerns of Difference Evaluation Functions," Mechanical Engineering, June 2014.

4. Chris Holmes Parker, "CLEAN Learning to Improve Coordination and Scalability in Multiagent Systems," Mechanical Engineering, June 2013.

3. Daniel Hennes, "Multiagent Learning: Dynamic Games and Applications, "Dept of Knowledge Engineering, Maastricht University, Netherlands, May 2013 (co-advised with Karl Tuyls).

2. Max Salichon, "Learning Based Methods for Micro Aerial Vehicle Control," Mechanical Engineering, March 2010.

1. Matt Knudson, "Navigation and Coordination of Autonomous Mobile Robots with Limited Resources," Mechanical Engineering, December 2009.

Masters Students Supervised:

21. Eric Klinkhammer, "Learning in Complex Domains: Leveraging Multiple Rewards through Alignment," Robotics, June 2018.

20. Drew Wilson, "Multi-objective Controller Performance for a Fuel Cell Turbine Hybrid Power System," Robotics, June 2017.

19. Brandon Gigous, "Approaches to Designing and Coordinating Unmanned Aerial Vehicles using Systems," Robotics, June 2017.

18. Aida Rahmattalabi, "D++: Structural Credit Assignment in Tightly Coupled Multiagent Domains," Robotics, June 2016.

17. Andrew Gabler, "Learning-based Control of Experimental Hybrid Fuel Cell Power Plant," Robotics, June 2015.

16. Sepide Kharaghani, "History-based Local Reward Shaping in Multiagent Systems," Robotics, June, 2015.

15. Beatrice Moissinac, "Reinforcement Learning-Based Off-Equilibrium Incentives to Approximate the VCG Mechanism," Computer Science, December 2013.

14. William Curran, "Using RUBI to Partition Agents in Air Traffic Problems with Hard Constraints," Computer Science, June 2013.

13. Carrie Rebhuhn, "A Multiagent Approach to Identifying Inovation in Design Components," Mechanical Engineering, March 2013.

12. Logan Yliniemi, "Coevolution and Transfer Learning in a Point-to-Point Fleet Coordination Problem," Mechanical Engineering, June 2012.

11. Stephen Sills, "A Neuro-evolutionary Multiagent Approach to Multi-linked Inverted Pendulum Control," Mechanical Engineering, June 2012.

10. Ehsan Nasroullahi, "Combining Coordination Mechanisms to Improve Performance in Multi-robot Teams," Mechanical Engineering, March 2012.

9. Mitch Colby, "Optimizing Ballast Design of Wave Energy Converters Using Evolutionary Algorithms," Mechanical Engineering, March 2012.

8. Chris Holmes-Parker, "Agent-Based Resource Allocation in Dynamically Formed CubeSat Constellations," Mechanical Engineering, December 2011.

7. Adam Bell, "Control and Coordination of multiple UAVs," Mechanical Engineering, Fall 2010.

6. Christian Roth, "Agent Objectives for Evolving Coordinated Sensor Networks," University of Applied Sciences, Offenburg, July 2010.

5. Brett Valenti, "Condensing Observation of Locale and Agents: A State Representation," Mechanical Engineering, March 2010.

4. Jack Shepherd, "A Hierarchical Neuro-Evolutionary Approach to Small Quadrotor control," Mechanical Engineering, March 2010.

3. Jaime Junell, "Adaptive Methods for Robust Commercial Vehicle Control," Mechanical Engineering, September 2009.

2. Niusha Khani, "Learning from Actions Not Taken in Multiagent Systems," Mechanical Engineering, June 2009.

1. Matt Knudson, "Applying Hierarchical and Adaptive Control to Coordinating Simple Robot," Mechanical Engineering, March 2008.

Honors Thesis (BS) Supervised:

3. Connor Yates, Computer Science, June 2017.

2. Jaime Junell, Mechanical Engineering, June 2008.

1. Melissa Jensen-Morgan, Mechanical Engineering, June 2008.

Undergraduate Research Assistants Supervised:

Theodore Duchow-Pressley, Mechanical Engineering (2015-present).
Abby Van Soest, NSF REU program, Summer 2016.
Tobi Ogunyale, NSF REU program, Summer 2016.
Joshua Cook, Mechanical Engineering (2015-2017).
Connor Yates, Computer Science (2015-2017).
Drew Wilson, NSF REU program (Summer 2014).
Carrie Rebhuhn, Mechanical Engineering (Fall 2010–Spring 2011).
Mitch Colby, Mechanical Engineering (Winter–Spring 2010).
Paul Filitchkin, Electrical Engineering and Computer Science (Spring 2009).
Rahul Tewari, Indian Institute of Technology, Kanpur (May–July 2007).
Rajiv Ranjan, Indian Institute of Technology, Kharagpur (May–July 2007).

Visiting Students Supervised:

Daniel Hennes, PhD student, University of Maastricht, Netherlands (Sep–Dec 2007; Mar–Sep 2010).
Christian Roth, MS student at the University of Applied Sciences in Offenburg (March–Sept. 2010).

Doctoral Committees:

Gilberto Marcon Dos Santos, Robotics (in progress).
Seth McCammon, Robotics (in progress).
Dylan Jones, Robotics (in progress).
Austin Nicolai, Robotics (in progress).
Andy Smith, Robotics (in progress).
Emilie Lemagie, CEOAS (in progress).
Saeed Ghanbartehrani, Industrial Engineering (2015).
Christian Hubicki, Mechanical Engineering (2014).
Chris Patton, Mechanical Engineering (2013).
Sarah Oman, Mechanical Engineering (2012).
Tao Wang, Electrical and Computer Engineering, (2012).
Nyree Lemmens, Computer Science, University of Maastricht (2011).
Delvin Peterson, Mechanical Engineering (2011).
Arun Wickramasuriya, Mechanical Engineering (2009).
Ben Dickinson, Mechanical Engineering (2009).

Sasidhar Lingam, Electrical and Computer Engineering (2009).
Adrian Agogino, Electrical and Computer Engineering, The University of Texas at Austin (2003).

Masters Committees at Oregon State University:

Ovunc Tuzel, Robotics (in progress).
Daniel Hulse, Mechanical Engineering (2017).
Ryan Skeele, Robotics, June 2016.
Nicolas Soria Zurita, Mechanical Engineering (2016).
Yawei Zhang, Robotics (2015).
Kevin Kemper, Mechanical Engineering (2012).
Devin Koepl, Mechanical Engineering (2011).
Chris Patton, Mechanical Engineering (2009).
Scott Bonnono, Mechanical Engineering (2009).
Cody Ray, Mechanical Engineering (2009).
Mike Chamblin, Mechanical Engineering (2008).
Joel Kolstad, Electrical and Computer Engineering (2007).

Summer Student Supervision (while at NASA Ames Research Center):

Nachi Gupta, Oxford University, 2005.
Angela Pignotti, University of California, Santa Cruz, 2003.
Charley Choe, Oxford University, 2003.
Stephane Airiau, University of Tulsa, 2002, 2004, 2005.
Adrian Agogino, The University of Texas, Austin. 2001, 2002, 2003.
Nikunj Oza, University of California, Berkeley. 1999, 2000.

Teaching Activities:

Oregon State University, Corvallis, OR:

Graduate Courses:
ROB 538: Autonomous Agents and MultiAgent Systems: F 2016, F 2014, F 2011,
    F 2009, F 2007.
ROB 537: Learning Based Control, F 2017, F 2015, F 2013, F 2010, F 2008
ME 534: Nonlinear Control: Spring 2007.

Undergraduate Courses:
ROB 456: Intelligent Robotics: F 2014.
MIME 101: Introduction to MIME (Robotics section): F 2013.
ME 430: Dynamic Systems and Control: F 2011, F 2010, F 2009, W 2008, F 2007, W 2007.
ECE 451: Dynamic Systems and Control: F 2011, F 2010, F 2009, W 2008, F 2007, W 2007.

The University of Texas, San Antonio, TX:
Electrical Circuits: Fall 96, Spring 97 (Sophomore, required).
Signals and Systems: Fall 96, Spring 97 (Sophomore/Junior, required).
Information Theory and Coding: Fall 96 (Senior, elective).
Neural Networks for Pattern Recognition: Spring 97 (Graduate).

The University of Texas, Austin, TX (Guest Lecturer):
Advanced Topics in Neural Networks: Spring 96 (Graduate; 2 lectures).
Computer Vision: Spring 96 (Senior; 2 lectures).

Curriculum Development:

Robotics Graduate Program (MENG, MS, PhD). Approved June 2014.

ROB 456: Intelligent Robotics. Senior elective on robotics. First offered Fall 2013.

ROB 537: Learning Based Control. Graduate class on learning and control in systems without accurate models. First offered in Fall 2008 as ME 539.

ROB 538: Autonomous Agents and Multi-Agent Systems. Graduate class on learning, coordination and control in large distributed systems. First offered in Fall 2007 as ME 539.

ME 514: Mechatronics. Modified topics and increased credits from 3 to 4. First offered in Spring 2008 under new format.

Outreach Activities:

Presenter in "Monte Carlo methods in Artificial Intelligence," short course for undergraduates. ("Spring Break with Artificial Intelligence," March 2012, March 2013).

Saturday Academy "Apprenticeships in Science and Engineering" (ASE) mentor 2011, 2012.

Local Media Outreach: Interviews with local media on impact of new air traffic management algorithms, March 2010, Corvallis/Eugene, OR. (Video link: http://kezi.com/page/166752)

Engineering Week: Visit local schools as part of a NASA program and present space sciences to 4th and 5th graders, March 1998, Sunnyvale, CA.

Discover Engineering: Panelist in a live NTU broadcast to answer questions from high school students interested in engineering, February 1997, Lisle, IL.

INVITED PRESENTATIONS (excluding presentations of papers listed under publications):

Plenary/Invited Talks at Conferences/Workshops:

1. "Multiagent Systems in Optimization: Where do agents fit and what are they trying to do?" **Invited talk** at the *6th International Workshop of Optimization in Multiagent Systems (AAMAS 2013)*, St. Paul, Minnesota May 7, 2013.

2. "Agents, Actions and Rewards in Air Traffic: Who controls What?" **Plenary talk** at the *Agent Technology for Safety, Security and Efficiency of Critical Infrastructures* Workshop, Prague, Czech Republic, June 2, 2012.

3. "Coordination in Distributed Autonomous Systems." **Plenary talk** at the *18th Annual Conference on Artificial Neural Networks in Engineering* St. Louis, MO, November 11, 2008.

4. "Learning in Multiagent Systems: Advances and Challenges." **Invited talk** at the *Adaptation and Learning in Agents* workshop at AAMAS 2008, Estoril, Portugal, May 12, 2008.

5. "Evolving Coordinated Multiagent Systems." **Invited talk** at the *Evolutionary Computation and Multi-Agent Systems and Simulation* workshop at GECCO 2007, London, UK, July 7, 2007.

6. "From Ensembles to Collectives: The changing face of MCS." **Invited talk** on future research directions at the sixth international workshop on *Multiple Classifier Systems*, Monterey, CA, June 2005.

Other Invited Talks and Presentations:

7. Webinar on Robotics (70+ attendees), **Hewlett Packard**, "State of Robotics at Oregon State University" January 19, 2017.

8. Laboratoire d'informatique to Paris 6 (LIP6), **Université Pierre et Marie Curie**, "Coordination in large multiagent systems: do agents need stock options ?" Paris, France, March 20, 2015.

9. **Idaho National Labs**, "Control and Optimization in large complex systems: do subsystems need stock options ?" Idaho Falls, ID, February 17, 2015.

10. Australian Centre for Field Robotics, **University of Sydney**, "Coordination in large multiagent systems: who does what, when and why?" Sydney, Australia, March 20, 2014.

11. Department of Automation and Systems Technology, **Helsinki University of Technology**, "Learning and Coordination in Multiagent Systems," Helsinki, Finland, September 11, 2009.

12. Creativity and Complex Systems Seminar (CRECOS), **Helsinki University of Technology**, "Coordination in Distributed Complex Systems," Helsinki, Finland, September 10, 2009.

13. PI Meeting, **Air Force Office of Scientific Research (AFOSR)**, "Coordinating Learning Agents for Active Information Collection," Arlington, VA, May 28, 2009.

14. Invited talk, **Boeing**, "Air Traffic Flow Management: A Multiagent Approach to Augment Current Operating Procedures," Bellevue, WA, April 30, 2009.

15. PI Meeting, **Air Force Office of Scientific Research (AFOSR)**, "Coordinating Learning Agents for Active Information Collection," Arlington, VA, June 4, 2008.

16. Applied Mathematics and Computation Seminar, **Oregon State University**,"Control and Coordination in Distributed Autonomous Systems: A Collectives Approach," April 18, 2008.

17. Materials Science Seminar, **Oregon State University**,"Optimization and Control in Complex Systems," April 26, 2007.

18. AI Seminar, School of Electrical Engineering and Computer Science, **Oregon State University**, "Collectives for Multi Agent Learning and Optimization," April 25, 2007.

19. Mechanical Engineering Seminar, **Oregon State University**, "Collectives: Control and Coordination in Distributed Autonomous Systems," November 3, 2006.

20. Department of Aerospace Engineering, **University of Maryland**, "Controls and Coordination in Distributed Autonomous Systems," College Park, MD, May 17, 2006.

21. Aeronautics Directorate, **NASA Ames Research Center**,"Collectives: An Approach to Control and Coordination in Air Transportation Systems," Moffett Field, CA, April 4, 2006.

22. Computer Science Dept., **University of Southern California**, "Learning and Coordination in Distributed Autonomous Systems," Los Angeles, CA, March 23, 2006.

23. Computing Science Dept., **University of Alberta**, "Learning and Coordination in Distributed Autonomous Systems," Edmonton, Alberta, March 17, 2006.

24. Computer Engineering Dept, **University of California, Santa Cruz,** "Control and Coordination in Complex Systems," Control Seminar, February 28, 2006.

25. Aerospace Engineering Dept., **Stanford University**, "Collectives and System Complexity," Stanford, CA, April 2005.

26. **Rocketdyne Propulsion and Power**,"Complexity Signatures for System Health Monitoring," Canoga Park, CA, March 2005.

27. **AAMAS 2004 workshop on challenges in the coordination of large scale multiagent systems**, "Coordination in Large Collectives," New York, NY, July 2004.

28. Workshop on Collectives and the Design of Complex Systems-2003, **Stanford University**, "Collectives," Stanford, CA, August 2003.

29. Autonomy and Robotics Area, **NASA Ames Research Center**,"Communication Restrictions in Collective," June 2003.

30. AI Group Seminar, **Jet Propulsion Laboratory**, "Collectives Everywhere," Pasadena, CA, April 2003.

31. Robosphere 2002, **NASA Ames Research Center**, "Collectives and Robotic Exploration," Moffett Field, CA, November 2002.

32. Workshop on Collectives and the Design of Complex Systems-2002, **NASA Ames Research Center**, "Introduction to Collectives," Moffett Field, CA, August 2002.

33. Collective Cognition – Mathematical Foundations of Distributed Intelligence, **Santa Fe Institute**, "Introduction to Collective Intelligence," Santa Fe, NM, January 25, 2002.

34. Computer Science Colloquium, **Sonoma State University**, "Collective Intelligence: Design of Large Distributed Systems," Sonoma, CA, November 15, 2001.

35. AI Seminar, Electrical Engineering and Computer Science Dept., **UC Berkeley**, "Distributed Control and Optimization with Collective Intelligence," Berkeley, CA, March, 2001.

36. **ICML Workshop on Multi-Agent Learning**, "Collective Intelligence: Designing Reward Functions in Distributed Reinforcement Learning," Stanford, CA, July, 2000.

37. RIACS Seminar, **NASA Ames Research Center**, "Optimal Reward Functions in Distributed Reinforcement Learning," Moffett Field, CA, May 11, 2000.

38. Learning Seminar, **Stanford University**, "An Introduction to Collective Intelligence," Stanford, CA, September 30, 1999.

39. Computational Sciences Division, **NASA Ames Research Center**, "Collective Intelligence: Application to Internet Traffic Routing," Moffett Field, CA, May 18, 1999.

40. Autonomy Seminar, **NASA Ames Research Center**, "Collective Intelligence: An Introduction," Moffett Field, CA, May 13, 1999.

41. Laboratory for Artificial Neural Systems, **The University of Texas**, "Collective Intelligence," Austin, TX, April, 1997.

42. **AAAI Workshop on Integrating Multiple Learning Models,** "Classifier Combining: Analytical Results and implications," Portland, OR, August 1996.

PUBLICATIONS: (Available from *http://engr.oregonstate.edu/~ktumer/publications/class_type.html*)

Books:

1. K. Tumer, P. Yolum, L. Sonenberg and P. Stone (editors). *Proceedings of the 10th International Conference on Autonomous Agents and MultiAgent Systems*, International Foundation for Autonomous Agents and Multiagent Systems (IFAAMAS), 2011.

2. C. Dagli, K. M. Bryden, M. Gen, S. Corns, G. Suer and K. Tumer (editors). *Intelligent Engineering Systems through Artificial Neural Networks*, Vol. 19, ASME Press, New York, 2009.

3. K. Tumer and D. H. Wolpert (editors). *Collectives and the Design of Complex Systems*. Springer, New York, 2004.

Journal Articles:

4. S. Khadka, J. J. Chung, C., and K. Tumer. Neuroevolution of a Modular Memory-Augmented Neural Network for Deep Memory Problems. *Evolutionary Computation Journal*. To appear.

5. J. J. Chung, C. Rebhuhn, C. Yates; G. A. Hollinger, and K. Tumer. A Multiagent Framework for Learning Dynamic Traffic Management Strategies. *Autonomous Robots*. Springer. 2018. DOI: 10.1007/s10514-018-9800-z

6. N. F. Soria, M. Colby, K. Tumer, C. Hoyle, and I. Y. Tumer. Design of Complex Engineering System Using Multiagent Coordination. *Journal of Computing and Information Science in Engineering (JCISE).* ASME. 18(2):011003, 2018.

7. L. Yliniemi and K. Tumer. Multi-Objective Multiagent Credit Assignment in Reinforcement Learning and NSGA-II. *Soft Computing.* 2016. DOI: 10.1007/s00500-016-2124-z.

8. M. Colby and L. Yliniemi and K. Tumer. Autonomous Multiagent Space Exploration with High Level Human Feedback. *Journal of Aerospace Information Systems.* 13(8):301-315, 2016.

9. M. Colby and K. Tumer. Fitness Function Shaping in Multiagent Cooperative Coevolutionary Algorithms. *Journal of Autonomous Agents and Multiagent Systems.* DOI: 10.1007/s10458-015-9318-0.

10. C. HolmesParker, A. Agogino, and K. Tumer. Combining Reward Shaping and Hierarchies for Scaling to Large Multiagent Systems. *Knowledge Engineering Review Special Issue on Adaptive Learning Agents.* 31(1):3-18, 2016.

11. A. Iscen, K. Caluwaerts, J. Bruce, A. Agogino, V. SunSpiral, and K. Tumer. Learning Tensegrity Locomotion Using Open-Loop Control Signals and Coevolutionary Algorithms. *Artificial life.* MIT Press. 21(2):119-140, 2015.

12. S. Proper and K. Tumer. Coordinating actions in congestion problems: Impact of top-down and bottom-up Utilities. *Journal of Autonomous Agents and Multiagent Systems*, 27 (3):419-443, 2013.

13. M. Knudson and K. Tumer. Dynamic Partnership Formation for Multi-Rover Coordination. *Advances in Complex Systems*, 16(1), 2013.

14. M. J. Norooz Oliaee, B. Hamdaoui and K. Tumer. Efficient Objective Functions for Coordinated Learning in Large-Scale Distributed OSA Systems. *IEEE Transactions on Mobile Computing*, 12 (5): 931–944, 2013.

15. M. Salichon and K. Tumer. A Neuro-evolutionary Approach to Control Surface Segmentation for Micro Aerial Vehicles. *International Journal of General Systems*, 42(7):793–805, 2013.

16. J. Junell and K. Tumer. Robust Predictive Cruise Control for Commercial Vehicles. *International Journal of General Systems*, 42(7):776–792, 2013.

17. A. Agogino and K. Tumer. A Multiagent Approach to Managing Air Traffic Flow. *Journal of Autonomous Agents and Multiagent Systems*, 24:1-25, 2012.

18. M. Salichon and K. Tumer. A Learning Based Approach to Robust Micro Aerial Vehicle Control. *IEEE Transactions on System, Man and Cybernetics–Part C*, 42(6): 1772–1783, 2012.

19. M. J. Norooz Oliaee, B. Hamdaoui and K. Tumer. Coordinating Secondary-User Behaviors for Inelastic Traffic Reward Maximization in Large-Scale DSA Networks. *IEEE Transactions on Network and Service Management*, 9(4): 501–513, 2012.

20. E. Nasroullahi and K. Tumer. Combining Coordination Mechanisms to improve the Performance of Multi-Robot Teams. *Artificial Intelligence Research*, 1(2):1–10, 2012.

21. M. Knudson and K. Tumer. Adaptive Navigation for Autonomous Robots. *Robotics and Autonomous Systems* 59:410–420, 2011.

22. A. Agogino and K. Tumer. A Multiagent Coordination Approach to Robust Consensus Clustering. *Advances in Complex Systems*, 13:165–197, 2010.

23. A.Agogino and K. Tumer. Learning Indirect Actions in Complex Domains: Action Suggestions for Air Traffic Control. *Advances in Complex Systems*, 12(4-5):493–512, 2009.

24. K. Tumer and N. Khani. Learning from Actions Not Taken in Multiagent Systems. *Advances in Complex Systems*, 12(4-5):455–473, 2009.

25. K. Tumer and A. Agogino. Multiagent Learning for Black Box System Reward Functions. *Advances in Complex Systems*, 12(4-5):475–492, 2009.

26. K. Tumer and A. Agogino. Ensemble Clustering with Voting Active Clusters. *Pattern Recognition Letters*, 29(14):1947–1953, 2008.

27. A. Agogino and K. Tumer. Efficient Evaluation Functions for Evolving Coordination. *Evolutionary Computation*, 16(2):257–288, 2008.

28. A. Agogino and K. Tumer. Analyzing and Visualizing Multiagent Rewards in Dynamic and Stochastic Domains. *Journal of Autonomous Agents and Multiagent Systems*, 17(2):320–338, 2008.

29. K. L. Milkman, J. Burns, D. C. Parkes, G. Barron and K. Tumer. Testing a Purportedly More Learnable Auction Mechanism. *Applied Economics Research Bulletin*, Special Issue 1 (Auctions):107–140, 2008.

30. N. C. Oza and K. Tumer. Classifier Ensembles: Select Real World Applications. *Information Fusion*, 9(1):4–20, 2008.

31. N. C. Oza and K. Tumer. Applications of Ensemble Methods, Guest Editorial, *Information Fusion*, 9(1):2–3, 2008.

32. A. Agogino and K. Tumer. Handling Communication Restrictions and Team Formation in Congestion Games. *Journal of Autonomous Agents and Multiagent Systems,* 13(1):97–115, 2006.

33. D. H. Wolpert, K. Tumer, and E. Bandari. Improving search algorithms by using intelligent coordinates. *Physical Review E*, 69, 2004.

34. K. Tumer and J. Ghosh. Bayes error rate estimation using classifier ensembles. *International Journal of Smart Engineering System Design*, 5(2):95–110, 2003.

35. K. Tumer and N. C. Oza. Input decimated ensembles. *Pattern Analysis and Applications*, 6(1):65–77, 2003.

36. K. Tumer and J. Ghosh. Robust combining of disparate classifiers through order statistics. *Pattern Analysis and Applications*, 5(2):189–200, 2002.

37. D. H. Wolpert and K. Tumer. Collective intelligence, data routing and Braess' paradox. *Journal of Artificial Intelligence Research*, 16:359–387, 2002.

38. D. H. Wolpert and K. Tumer. Optimal payoff functions for members of collectives. *Advances in Complex Systems*, 4(2/3):265–279, 2001.

39. D. H. Wolpert and K. Tumer. Collective Intelligence for Optimization. Pages 48-50 of collective article: Statistical Machine Learning for Large Scale Optimization, J. Boyan, W. Buntine, and A. Jagota (Eds.). *Neural Computing Surveys*, 3:1–58, 2000.

40. D. H. Wolpert, K. Wheeler, and K. Tumer. Collective intelligence for control of distributed dynamical systems. *Europhysics Letters*, 49(6), March 2000.

41. K. Tumer, N. Ramanujam, J. Ghosh, and R. Richards-Kortum. Ensembles of radial basis function networks for spectroscopic detection of cervical pre-cancer. *IEEE Transactions on Biomedical Engineering*, 45(8):953–961, 1998.

42. K. Tumer and J. Ghosh. Analysis of decision boundaries in linearly combined neural classifiers. *Pattern Recognition*, 29(2):341–348, 1996.

43. K. Tumer and J. Ghosh. Error correlation and error reduction in ensemble classifiers. *Connection Science*, 8(3/4):385–404, 1996.

44. J. N. Amaral, K. Tumer, and J. Ghosh. Designing genetic algorithms for the state assignment problem. *IEEE Transactions on Systems, Man and Cybernetics*, 25(4):687–695, April 1995.

45. J. Ghosh and K. Tumer. Structural adaptation and generalization in supervised feedforward networks. *Journal of Artificial Neural Networks*, 1(4):431–458, 1994.

Magazine Articles:

46. L. Yliniemi, A. Agogino and K. Tumer. Multi-Robot Coordination for Space Exploration. *AI Magazine*, 2014.

47. L. Sonenberg, P. Stone, K. Tumer and P. Yolum. Introduction to the AI Magazine AAMAS 2011 Special Issue. *AI Magazine*, 2012.

48. K. Tumer and M. Knudson. Aligning Agent Objectives for Learning and Coordination in Multiagent Systems. *PerAda Magazine*, (DOI: 10.2417/2201010.003362), Oct, 2010.

49. K. Tumer and A. Agogino. Improving Air Traffic Management with a Learning Multiagent System. *IEEE Intelligent Systems*, 24(1):18-21, 2009.

Book Chapters:

50. M. Knudson and K. Tumer. Efficient State Spaces and Policy Transfer for Robot Navigation. In L. Garcia, editor, *Advanced Robotics*, Concept Press, 2013.

51. K. Tuyls and K. Tumer. Multiagent Learning. In G. Weiss, editor, *Multiagent Systems*, Springer, 2013.

52. K. Tumer and J. Lawson. Coordinating Learning Agents for Multiple Resource Job Scheduling. In M. Taylor and K. Tuyls, editors, *Adaptive and Learning Agents*, Springer, 2010.

53. K. Tumer, A. Agogino and Z. Welch. Traffic Congestion Management as a Learning Agent Coordination Problem. In A. Bazzan and F. Kluegl, editors, *Multiagent Architectures for Traffic and Transportation Engineering*, 2009.

54. K. Tumer and A. Agogino. Coordinating Multi-Rover Systems: Evaluation Functions for Dynamic and Noisy Environments. In S. Yang, editors, *Evolutionary Computation in Dynamic and Uncertain Environments*, pages 371–388, Springer, 2007.

55. K. Tumer and A. Agogino. Efficient Reward Functions for Adaptive Multi-Rover Systems. In K. Tuyls, P. Jan't Hoen, S. Sen and K. Verbeeck, editors, *Learning and Adaptation in Multi Agent Systems*, pages 177–191, Springer, Lecture Notes in AI, 2006.

56. K. Tumer. Designing agent utilities for coordinated, scalable and robust multiagent systems. In P. Scerri, R. Mailler, and R. Vincent, editors, *Challenges in the Coordination of Large Scale Multiagent Systems*, pages 173–188, Springer, 2005.

57. S. Airau, S. Sen, D. H. Wolpert, and K. Tumer. Providing effective access to shared resources: A COIN approach. In G. Di Marzo Serugendo, A. Karageorgos, O. F. Rana, and F. Zambonelli, editors, *Engineering Self-Organizing Systems: Nature-Inspired Approaches to Software Engineering*, volume 2977 of *Lecture Notes in Computer Science*, pages 249–264. Springer-Verlag, 2004.

58. K. Tumer and D. H. Wolpert. A survey of collectives. In K. Tumer and D. H. Wolpert, editors, *Collectives and the Design of Complex Systems*, pages 1–42. Springer, 2004.

59. D. H. Wolpert and K. Tumer. Optimal payoff functions for members of collectives. In F. Schweitzer, editor, *Modeling Complexity in Economic and Social Systems*, chapter 20, pages 355–369. World Scientific, 2002.

60. K. Tumer and J. Ghosh. Robust order statistics based ensembles for distributed data mining. In H. Kargupta and P. Chan, editors, *Advances in Distributed and Parallel Knowledge Discovery*, pages 185–210. AAAI/MIT Press, 2000.

61. K. Tumer and J. Ghosh. Linear and order statistics combiners for pattern classification. In A. J. C. Sharkey, editor, *Combining Artificial Neural Nets: Ensemble and Modular Multi-Net Systems*, pages 127–162. Springer-Verlag, London, 1999.

62. J. Ghosh, K. Tumer, S. Beck, and L. Deuser. Integration of neural classifiers for passive sonar signals. In C.T. Leondes, editor, *Control and Dynamic Systems—Advances in Theory and Applications*, volume 77, pages 301–338. Academic Press, 1996.

Highly Refereed Conferences (Acceptance rate below 50%):

63. S. Khadka, J. J. Chung, C., and K. Tumer. Using Evolution to Guide Policy Gradients for Evolutionary Reinforcement Learning. *In Neural Information Processing Systems (NIPS)*, Montreal, Canada, December 2018. To appear. (21% acceptance).

64. J. J. Chung, S. Chow, and K. Tumer. When less is more: Reducing agent noise with probabilistically learning agents (Extended Abstract). *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. Stockholm, Sweden, July 2018 (48% acceptance).

65. S. Khadka, C. Yates, and K. Tumer. A Memory-Based Multiagent Framework for Adaptive Decision Making (Extended Abstract). *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. Stockholm, Sweden, July 2018 (48% acceptance).

66. S. Khadka, J. J. Chung, and K. Tumer. Memory-Augmented Multi-Robot Teams that Learn to Adapt. *Proceedings of the International Symposium on Multi-Robot and Multi-Agent Systems (MRS'17)*. IEEE. Los Angeles, CA, December 2017 (24% acceptance).

67. S. Khadka, J. J. Chung, and K. Tumer. Evolving Memory-Augmented Neural Architectures for Deep Memory Problems. *Proceedings of Genetic and Evolutionary Computation Conference (GECCO)*, Berlin, Germany, July 2017. Nominated for best paper award (37% acceptance).

68. M. Colby, T. Duchow-Pressley, J. J. Chung, and K. Tumer. Local Approximation of Difference Evaluation Functions. *Proceedings of the the Fifteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, pp. 521-529, Singapore, May 2016 (25% acceptance).

69. A. Rahmattalabi, J. J. Chung, M. Colby and K. Tumer. D++: Structural credit assignment in tightly coupled multiagent domains. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016)*, pp. 4424-4429, 2016 (48% acceptance).

70. M. Colby, L. Yliniemi, P. Pezzini, D. Tucker, K.M. Bryden, and K. Tumer. Multi-objective Neuro-evolutionary Control for a Fuel Cell Turbine Hybrid Energy System. *Proceedings of Genetic and Evolutionary Computation Conference (GECCO)*, pp. 877-864, Denver, CO, July 2016 (36% acceptance).

71. S. Khadka, K. Tumer M. Colby, D. Tucker, P. Pezzini, and K.M. Bryden. Neuroevolution of a Hybrid Power Plant Simulator. *Proceedings of Genetic and Evolutionary Computation Conference (GECCO)*, pp. 917-924, Denver, CO, July 2016 (36% acceptance).

72. C. Rebhuhn and J. J. Chung and R. Skeele and G. Hollinger and K. Tumer. Learning to Trick Cost-Based Planners into Cooperative Behavior. *The 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2015)*. Hamburg, Germany, September 2015. (46% acceptance)

73. M. Colby and J. Chung and K. Tumer. Implicit Adaptive Multi-Robot Coordination in Dynamic Environments. *The 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2015)*. Hamburg, Germany, September 2015. (46% acceptance)

74. M. Colby and K. Tumer. An Evolutionary Game Theoretic Analysis of Difference Evaluation Functions. In *In Proceedings of Genetic and Evolutionary Computation Conference (GECCO)*, Madrid, Spain, July 2015. (36% acceptance)

75. M. Colby, C. Holmes Parker, S. Kharaghani and K. Tumer. Counterfactual Exploration for Improving Multiagent Learning. *Proceedings of the the Fourteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Istanbul, Turkey, May 2015. (25% acceptance)

76. M. Colby and K. Tumer. A Replicator Dynamics Analysis of Difference Evaluation Functions (Extended Abstract). *Proceedings of the the Fourteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Istanbul, Turkey, May 2015. (47% acceptance)

77. L. Yliniemi and K. Tumer. Multi-Objective Multiagent Credit Assignment in NSGA-II Using Difference Evaluations (Extended Abstract). *Proceedings of the the Fourteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Istanbul, Turkey, May 2015. (47% acceptance)

78. M. Colby, W. Curran and K. Tumer. Approximating Difference Evaluations with Local Knowledge (Extended Abstract). *Proceedings of the the Fourteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Istanbul, Turkey, May 2015. (47% acceptance)

79. A. Iscen , A. Agogino, V. SunSpiral and K. Tumer. Flop and Roll: Learning Robust Goal-Directed Locomotion for a Tensegrity Robot. *The 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2014),* Chicago, IL, September 2014. (47% acceptance)

80. L. Yliniemi , A. Agogino and K. Tumer. Evolutionary Agent-Based Simulation of the Introduction of New Technologies in Air Traffic Management. In *Proceedings of the the Genetic and Evolutionary Computation Conference*, Vancouver, Canada, July 2014. (33% acceptance)

81. W. Curran, A. Agogino and K. Tumer. Hierarchical Simulation for Complex Domains : Air Traffic Flow Management. In *Proceedings of the the Genetic and Evolutionary Computation Conference*, Vancouver, Canada, July 2014. (33% acceptance)

82. C. Rebhuhn, B. Gilchrist, S. Oman, I.Y. Tumer, R. Stone and K. Tumer. A Multiagent Approach to Identifying Innovative Component Selection. *Proceedings of the the Sixth International Conference on Design Computing and Cognition*, London, UK, June 2014. (29% acceptance)

83. S. Devlin, L. Yliniemi, D. Kudenko and K. Tumer. Potential-Based Difference Rewards for Multiagent Reinforcement Learning. *Proceedings of the the Thirteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Paris, France, May 2014. (24% acceptance)

84. M. Colby, W. Curran, C. Rebhuhn and K. Tumer. Approximating Difference Evaluations with Local Knowledge (Extended Abstract). *Proceedings of the the Thirteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Paris, France, May 2014. (46% acceptance)

85. W. Curran, A. Agogino and K. Tumer. Using Reward/Utility Based Impact Scores in Partitioning (Extended Abstract) *Proceedings of the the Thirteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Paris, France, May 2014. (46% acceptance)

86. C. HolmesParker, M. Taylor, A. Agogino and K. Tumer. CLEANing the Reward: Counterfactual Actions Remove Exploratory Action Noise in Multiagent Learning (Extended Abstract) *Proceedings of the the Thirteenth International Joint Conference on Autonomous Agents and Multiagent Systems*, Paris, France, May 2014. (46% acceptance)

87. S. Proper and K. Tumer. Multiagent Learning with a Noisy Global Reward Signal. *Proceedings of the Twenty-Seventh AAAI Conference on Artificial Intelligence (AAAI-13)*, Bellevue, WA, July 2013. (29% acceptance)

88. A. Iscen, A. Agogino, V. SunSpiral and K. Tumer. Controlling Tensegrity Robots through Evolution. *Proceedings of the Genetic and Evolutionary Computation Conference*, Amsterdam, The Netherlands, July 2013.

89. C. HolmesParker, A. Agogino and K. Tumer. CLEAN Rewards for Improving Multiagent Coordination in the Presence of Exploration (extended abstract). *Proceedings of the Twelveth International Joint Conference on Autonomous Agents and Multiagent Systems*, Minnesota, MN, May 2013. (44% acceptance)

90. S. Proper and K. Tumer. Graphical Models in Continuous Domains for Multiagent Reinforcement Learning (extended abstract). *Proceedings of the Twelveth International Joint Conference on Autonomous Agents and Multiagent Systems*, Minnesota, MN, May 2013. (44% acceptance)

91. Atil Iscen and K. Tumer. Decentralized Coordination via Task Decomposition and Reward Shaping (extended abstract). *Proceedings of the Twelveth International Joint Conference on Autonomous Agents and Multiagent Systems*, Minnesota, MN, May 2013. (44% acceptance)

92. C. HolmesParker, A. Agogino and K. Tumer. Exploiting Structure and Utilizing Agent-Centric Rewards to Promote Coordination in Large Multiagent Systems (extended abstract). *Proceedings of the Twelveth International Joint Conference on Autonomous Agents and Multiagent Systems*, Minnesota, MN, May 2013. (44% acceptance)

93. W. Curran, A. Agogino and K. Tumer. Addressing Hard Constraints in the Air Traffic Problem through Partitioning and Difference Rewards (extended abstract). *Proceedings of the Twelveth International Joint Conference on Autonomous Agents and Multiagent Systems*, Minnesota, MN, May 2013. (44% acceptance)

94. A. Iscen, A. Agogino, V. SunSpiral and K. Tumer. Learning to Control Complex Tensegrity Robots (extended abstract). *Proceedings of the Twelveth International Joint Conference on Autonomous Agents and Multiagent Systems*, Minnesota, MN, May 2013. (44% acceptance)

95. M. Colby and K. Tumer. Multiagent Reinforcement Learning in a Distributed Sensor Network with Indirect Feedback. *Proceedings of the Twelveth International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 941-948, Minnesota, MN, May 2013. (22% acceptance)

96. A. Agogino, C. Holmes-Parker and K. Tumer. Evolving Large Scale UAV Communication Systems. **Best Applications Paper Award.** *Proceedings of the Genetic and Evolutionary Computation Conference*. Philadelphia, PA, July 2012. (40% acceptance)

97. A. Agogino, C. Holmes-Parker, and K. Tumer. Evolving Distributed Resource Sharing for CubeSat Constellations *Proceedings of the Genetic and Evolutionary Computation Conference*. Philadelphia, PA, July 2012. (40% acceptance)

98. M. Colby and K. Tumer. Shaping Fitness Functions for Coevolving Cooperative Multiagent Systems. *Proceedings of the Eleventh International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 425–432. Valencia, Spain, June 2012. (20% acceptance)

99. S. Proper and K. Tumer. Modeling Difference Rewards for Multiagent Learning (Extended Abstract). *Proceedings of the Eleventh International Joint Conference on Autonomous Agents and Multiagent Systems*, Valencia, Spain, June 2012. (44% acceptance)

100. M. Colby, E. Nasroullahi and K. Tumer. Optimizing Ballast Design of Wave Energy Converters Using Evolutionary Algorithms In *Proceedings of the Genetic and Evolutionary Computation Conference*. pages 1739-1746, Dublin, ireland, July 2011. (45% acceptance)

101. C. Roth, M. Knudson and K. Tumer. Agent Fitness Functions for Evolving Coordinated Sensor Networks *Proceedings of the Genetic and Evolutionary Computation Conference*, pages 275-282. Dublin, ireland, July 2011. (45% acceptance)

102. M. Salichon and K. Tumer. A Neuro-Evolutionary Approach to Micro Aerial Vehicle Control. *Proceedings of the Genetic and Evolutionary Computation Conference*, pages 1123-1130. Portland, OR, July 2010. Nominated for best paper award in Real World Applications. (45% acceptance)

103. M. Knudson and K. Tumer. Coevolution of Heterogeneous Multi-Robot Teams. *Proceedings of the Genetic and Evolutionary Computation Conference*, pages 127-134. Portland, OR, July 2010. (45% acceptance)

104. J. Shepherd III and K. Tumer. Robust Neuro-Control for A Micro Quadrotor. *Proceedings of the Genetic and Evolutionary Computation Conference*, pages 1131-1138. Portland, OR, July 2010. Nominated for best paper award in Real World Applications. (45% acceptance)

105. M. Knudson and K. Tumer. Robot Coordination with Ad-hoc Team Formation (extended abstract). *Proceedings of the Ninth International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 1441-1442. Toronto, CA, May 2010. (43% acceptance)

106. N. Khani and K. Tumer. Learning from Actions Not Taken: A Multiagent Learning Algorithm (extended abstract). *Proceedings of the Eighth International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 1277-1278. Budapest, Hungary, May 2009. (41% acceptance)

107. A. Agogino and K. Tumer. Improving Air Traffic Management through Agent Suggestions (extended abstract). *Proceedings of the Eighth International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 1271-1272. Budapest, Hungary, May 2009. (41% acceptance)

108. K. Tumer and A. Agogino. Adaptive Management of Air Traffic Flow: A Multiagent Coordination Approach. *Proceedings of the Twenty Third AAAI Conference on Artificial Intelligence, Nectar Track*. Chicago, IL, July 2008. (21% acceptance)

109. A. Agogino and K. Tumer. Regulating Air Traffic Flow with Coupled Agents. *Proceedings of the Seventh International Joint Conference on Autonomous Agents and Multiagent Systems*. Estoril, Portugal, May 2008. (22% acceptance)

110. K. Tumer, Z. Welch and A. Agogino. Aligning social welfare and agent preferences to alleviate traffic congestion. *Proceedings of the Seventh International Joint Conference on Autonomous Agents and Multiagent Systems*. Estoril, Portugal, May 2008. (22% acceptance)

111. A. Agogino and K. Tumer. Evolving Distributed Agents for Managing Air Traffic. *The Genetic and Evolutionary Computation Conference*, London, UK, July 2007. (46% acceptance)

112. K. Tumer and A. Agogino. Distributed Agent-Based Air Traffic Flow Management. **Best Paper Award** (out of 531 submissions). *Proceedings of the Sixth International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 330-337. Honolulu, HI, May 2007. (22% acceptance)

113. A. Agogino and K. Tumer. QUICR-Learning for Multiagent Coordination. *Proceedings of the Twenty First National Conference on Artificial Intelligence*, Boston, MA, July 2006. (21% oral presentation)

114. A. Agogino and K. Tumer. Distributed Evaluation Functions for Fault Tolerant Multi-Rover Systems. *The Genetic and Evolutionary Computation Conference*, Seattle, WA, July 2006. (46% acceptance)

115. A. Agogino and K. Tumer. Efficient agent-based cluster ensembles. *Proceedings of the Fifth International Joint Conference on Autonomous Agents and Multiagent Systems*, Hakodate, Japan, May 2006. (22% acceptance)

116. K. Tumer. Coordinating simple and unreliable agents (short paper). *Proceedings of the Fifth International Joint Conference on Autonomous Agents and Multiagent Systems*, Hakodate, Japan, May 2006.

117. N. Gupta, A. Agogino and K. Tumer. Efficient Agent-Based Models for Non-Genomic Evolution. *Proceedings of the Fifth International Joint Conference on Autonomous Agents and Multiagent Systems*, Hakodate, Japan, May 2006. (22% acceptance; 10% oral presentation)

118. A. Agogino and K. Tumer. Multi agent reward analysis for learning in noisy domains. *Proceedings of the Fourth International Joint Conference on Autonomous Agents and Multiagent Systems*, Utrecht, Netherlands, July 2005. (25% acceptance)

119. K. Tumer and A. Agogino. Coordinating multi-rover systems: Evaluation functions for dynamic and noisy environments. *The Genetic and Evolutionary Computation Conference*, Washington, DC, June 2005. (46% acceptance)

120. A. Agogino, K. Tumer, and R. Miikknulainen. Efficient credit assignment through evaluation function decomposition. *The Genetic and Evolutionary Computation Conference*, Washington, DC, June 2005. (46% acceptance)

121. A. Agogino and K. Tumer. Unifying temporal and structural credit assignment problems. *Proceedings of the Third International Joint Conference on Autonomous Agents and Multiagent Systems*, New York, NY, July 2004. (25% acceptance)

122. K. Tumer and A. Agogino. Time-extended policies in multiagent reinforcement learning. *Proceedings of the Third International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 1336–1337, New York, NY, July 2004. (25% acceptance)

123. A. Agogino and K. Tumer. Efficient evaluation functions for multi-rover systems. *The Genetic and Evolutionary Computation Conference*, pages 1–12, Seattle, WA, June 2004. (50% acceptance)

124. K. Tumer and J. Lawson. Collectives for multiple resource job scheduling across heterogeneous servers (short paper). *Proceedings of the Second International Joint Conference on Autonomous Agents and Multiagent Systems*, Melbourne, Australia, July 2003.

125. A. Agogino and K. Tumer. Team formation and communication restrictions in collectives (short paper). *Proceedings of the Second International Joint Conference on Autonomous Agents and Multiagent Systems*, Melbourne, Australia, July 2003.

126. K. Tumer, A. Agogino, and D. H. Wolpert. Learning sequences of actions in collectives of autonomous agents. *Proceedings of the First International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 378–385, Bologna, Italy, July 2002. (26% acceptance)

127. D. H. Wolpert, J. Sill, and K. Tumer. Reinforcement learning in distributed domains: Beyond team games. *Proceedings of the Seventeenth International Joint Conference on Artificial Intelligence*, pages 819–824, Seattle, WA, 2001. (25% acceptance)

128. K. Tumer and D. H. Wolpert. Collective intelligence and Braess' paradox. *Proceedings of the Seventeenth National Conference on Artificial Intelligence*, pages 104–109, Austin, TX, 2000. (33% acceptance)

129. D. H. Wolpert, S. Kirshner, C. J. Merz, and K. Tumer. Adaptivity in agent-based routing for data networks. *Proceedings of the fourth International Conference of Autonomous Agents*, pages 396–403, Barcelona, Spain, 2000.

130. D. H. Wolpert, K. Wheeler, and K. Tumer. General principles of learning-based multiagent systems. *Proceedings of the Third International Conference of Autonomous Agents*, pages 77–83, May 1999.

131. D. H. Wolpert, K. Tumer, and J. Frank. Using collective intelligence to route internet traffic. M. Kearns, S. A. Solla, and D. Cohn, editors, *Advances in Neural Information Processing Systems - 11*, pages 952–958. MIT Press, 1999.

132. K. Tumer, N. Ramanujam, R. Richards-Kortum, and J. Ghosh. Spectroscopic detection of cervical precancer through radial basis function networks. M. C. Mozer, M. I. Jordan, and T. Petsche, editors, *Advances in Neural Information Processing Systems - 9*, pages 981–987. MIT Press, 1997.

133. K. Tumer and J. Ghosh. Estimating the Bayes error rate through classifier combining. *Proceedings of the Thirteenth International Conference on Pattern Recognition*, pages IV:695–99, Vienna, Austria, August 1996.

Other Refereed Conferences (Acceptance rate above 50%):

134. S. Khadka, G. Rockefeller, D. Tucker, P. Pezzini, K. Bryden and K. Tumer Neuroevolution of an Advanced Power Plant Controller. *Proceedings of the 2018 ISA Power Industry Conference*, Knoxville, TN, June 2018.

135. D. Hulse, B. Gigous, K. Tumer, C. Hoyle, and I. Y. Tumer. Towards a Distributed Multiagent Learning-Based Design Optimization Method. *Proceedings of ASME 2017 International Design Engineering and Computers and Information in Engineering Conference Technical Conferences (IDETC/CIE)*, August 2017.

136. S. Khadka, A. Wilson, D. Tucker, P. Pezzini, K. Bryden and K. Tumer Evolving Neural Controllers for Robust and Reconfigurable Control of and Advanced Power Plant. *Proceedings of the 2017 ISA Power Industry Conference*, Cleveland, OH, June 2017.

137. N. F. Soria, M. K. Colby, I. Y. Tumer, C. Hoyle and K. Tumer. Design of Complex Engineering Systems Using Multiagent Coordination. *Proceedings of ASME 2016 International Design Engineering and Computers and Information in Engineering Technical Conferences (IDETC/CIE)*, Charlotte, NC, August 2016.

138. C. A. Manion, N. F. Soria, K. Tumer, C. Hoyle, and I.Y. Tumer. Designing a self-replicating robotic manufacturing factory. *Proceedings of ASME 2015 International Design Engineering and Computers and Information in Engineering Technical Conferences (IDETC/CIE)*, Boston, MA, August 2015.

139. A. Gabler, M. Colby and K. Tumer. Learning Based Control of a Fuel Cell Turbine Hybrid Power System (Extended Abstract). *Proceedings of Genetic and Evolutionary Computation Conference (GECCO)*, Madrid, Spain, July 2015.

140. M. Colby and K. Tumer. Learning-Based Coordination of Large Heterogeneous Distributed Sensor Networks. *Proceedings of the 2015 International Society of Automation Power Industry Division Symposium*. Kansas City, June 2015.

141. L. Yliniemi and K. Tumer. Multi-Objective Multiagent Credit Assignment Through Difference Rewards in Reinforcement Learning. *The Tenth International Conference on Simulated Evolution And Learning (SEAL 2014),* Dunedin, New Zealand, December 2014.

142. L. Yliniemi and K. Tumer. PaCcET: An Objective Space Transformation to Iteratively Convexify the Pareto Front. *The Tenth International Conference on Simulated Evolution And Learning (SEAL 2014),* Dunedin, New Zealand, December 2014.

143. C. HolmesParker, M. Taylor, A. Agogino and K. Tumer. CLEAN Rewards to Improve Coordination by Removing Exploratory Action Noise. *International Conference on Intelligent Agent Technology,* Warsaw, Poland, August 2014.

144. M. Colby and K. Tumer. Distributed Sensor Network Control with Evolutionary Algorithms. *Proceedings of the 2014 International Society of Automation Power Industry Division Symposium,* Scottsdale, Arizona, 2014

145. L. Yliniemi and K. Tumer. Elo Ratings for Structural Credit Assignment in Multiagent Systems. *Late Breaking Papers track of AAAI-13*, Bellevue, WA, July 2013.

146. W. Curran, A. Agogino and K. Tumer. Partitioning Agents and Shaping Their Evaluation Functions in Air Traffic Problems with Hard Constraints (short paper). *Proceedings of the Genetic and Evolutionary Computation Conference*, Amsterdam, The Netherlands, July 2013.

147. M. Knudson and K. Tumer. Policy Transfer in Mobile Robots using Neuro-Evolutionary Navigation (extended abstract). *Proceedings of the Genetic and Evolutionary Computation Conference.* Philadelphia, PA, July 2012.

148. B. Hamdaoui , M. J. Norooz Oliaee and K. Tumer. Aligning Spectrum-User Objectives for Maximum Inelastic-Traffic Reward. *The Proceedings of the 2011 International Conference on Computer Communication Networks (ICCCN).* Maui, Hawaii, July 31-Aug 4, 2011.

149. M. J. Norooz Oliaee, B. Hamdaoui and K. Tumer. Achieving Optimal Elastic Traffic Rewards in Dynamic Multichannel Access. *Proc of IEEE International Conference on High Performance Computing and Simulation Conference (HPCS 2011).* Istanbul, Turkey, July 4-8, 2011.

150. M. Knudson and K. Tumer. Towards Coordinating Autonomous Robots for Exploration in Dynamic Environments. *Intelligent Engineering Systems through Artificial Neural Networks*, Vol 18, pp. 587-594, ASME Press, St. Louis, MO, November 2008.

151. M. Knudson and K. Tumer. Neuro-Evolutionary Navigation for Resource-Limited Mobile Robots. *Intelligent Engineering Systems through Artificial Neural Networks*, Vol 18, pp. 27-34, ASME Press, St. Louis, MO, November 2008. **2nd runner up for best application paper award.**

152. N. Khani and K. Tumer. Fast Multiagent Learning: Cashing in on Team Knowledge. *Intelligent Engineering Systems through Artificial Neural Networks*, Vol 18, pp 3–10, ASME Press, St. Louis, MO, November 2008. **1st runner up for best theoretical development paper award.**

153. J. Junell, M. Knudson and K. Tumer. Optimization of Sensor/Neuro-Controller Pairings for Effective Navigation. *Intelligent Engineering Systems through Artificial Neural Networks*, Vol 18, pp. 19-26, ASME Press, St. Louis, MO, November 2008.

154. M. Salichon and K. Tumer. A Neuro-evolutionary Approach to Micro Aerial Vehicle Control. *Intelligent Engineered Systems through Artificial Neural Networks*, Vol 18, pp. 11-18, ASME Press, St. Louis, MO, November 2008.

155. A. Agogino and K. Tumer. Entropy Based Anomaly Detection Applied to Space Shuttle Main Engines. *Proceedings of the IEEE Aerospace Conference*, Big Sky, MT, March 2006.

156. K. Tumer and A. Agogino. Robust Coordination of a Large Set of Simple Rovers. *Proceedings of the IEEE Aerospace Conference*, Big Sky, MT, March 2006.

157. K. Tumer and A. Agogino. Complexity signatures for system health monitoring. *Proceedings of the IEEE Aerospace Conference*, Big Sky, MT, March 2005.

158. K. Tumer and A. Agogino. Overcoming communication restrictions in collectives. *Proceedings of the International Joint Conference on Neural Networks*, Budapest, Hungary, July 2004.

159. K. Tumer and D. H. Wolpert. Coordination in large collectives. Y. Bar-Yam, editor, *Fifth International Conference on Complex Systems - 2004*.

160. N. C. Oza, I. Y. Tumer, K. Tumer, and E. Huff. Classification of aircraft maneuvers for fault detection. J. Kittler and F. Roli, editors, *Proceedings of the Fourth International Workshop on Multiple Classifier Systems*, pages 375–384, Surrey, UK, June 2003. Springer.

161. D. H. Wolpert and K. Tumer. Optimal reward functions in distributed reinforcement learning. *Proceedings of the Second Asia-Pacific Conference on Intelligent Agent Technology (IAT-2001)*, Maebashi City, Japan, October 2001.

162. N. C. Oza and K. Tumer. Input decimated ensembles: Decorrelation through dimensionality reduction. J. Kittler and F. Roli, editors, *Proceedings of the Second International Workshop on Multiple Classifier Systems*, pages 238–249. Springer, Cambridge, UK, June 2001.

163. K. Tumer and N. C. Oza. Decimated input ensembles for improved generalization. *Proceedings of the International Joint Conference on Neural Networks*, Washington, D.C., July 1999.

164. K. Tumer, K. D. Bollacker, and J. Ghosh. A mutual information based ensemble method to estimate the Bayes error. C. Dagli et al., editor, *Intelligent Engineering Systems through Artificial Neural Networks*, volume 8, pages 17–22. ASME Press, St. Louis, MO, November 1998.

165. K. Tumer and J. Ghosh. Classifier combining through trimmed means and order statistics. *Proceedings of the International Joint Conference on Neural Networks*, pages 757–762, Anchorage, AL, June 1998.

166. K. Tumer and J. Ghosh. Limits to performance gains in combined neural classifiers. *Intelligent Engineering Systems through Artificial Neural Networks*, volume 7, pages 419–424, St. Louis, MO, November 1995.

167. K. Tumer and J. Ghosh. Order statistics combiners for neural classifiers. *Proceedings of the World Congress on Neural Networks*, pages I:31–34, Washington D.C., July 1995. INNS Press.

168. K. Tumer and J. Ghosh. Boundary variance reduction for improved classification through hybrid networks (Invited paper). *Applications and Science of Artificial Neural Networks, Proceedings of the SPIE (Vol. 2492)*, pages 573–584, April 1995.

169. K. Tumer and J. Ghosh. A framework for estimating performance improvements in hybrid pattern classifiers. *Proceedings of the World Congress on Neural Networks*, pages III:220–225, San Diego, June 1994. INNS Press.

170. K. Tumer and J. Ghosh. Sequence recognition by input anticipation. *Proceedings of the Seventh International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems*, Austin, TX, June 1994.

171. J. Ghosh, K. Tumer, S. Beck, and L. Deuser. Integration of local and global neural classifiers for passive sonar signals. *Proceedings of the International Simulation Technology Conference*, pages 539–545, Houston, TX, November 1992.

172. J. N. Amaral, J. Ghosh, and K. Tumer. Applying genetic algorithms to the state assignment problem: A case study. *Adaptive and Learning Systems, Proceedings of the SPIE (Vol. 1706)*, pages 2–13, Orlando, FL, April 1992.

173. K. Tumer, D. Torres, and R. Chemali. A new algorithm for automatic shoulder bed correction. *Transactions of the Society of Professional Well Log Analysts' 32nd Annual Logging Symposium (SPWLA)*, Midland, TX, June 1991.

Workshop/Symposia:

174. G. Rockefeller, S. Chow, Y. Tuladhar, and K. Tumer. Policy Progress Score for Automatic Task Selection in Curriculum Learning. *AAMAS-2018 Workshop on Adaptive and Learning Agents,* Stockholm, Sweden, July 2018.

175. E. Klinkhammer, C. Yates, Y. Tuladhar, and K. Tumer. Learning in Complex Domains: Leveraging Multiple Rewards through Alignment. *AAMAS-2018 Workshop on Adaptive and Learning Agents,* Stockholm, Sweden, July 2018.

176. N. Lawrance, J. J. Chung, G. A. Hollinger, and K. Tumer. Shortest path exploration with fast marching. Proceedings of the ICRA 2015 Workshop Beyond Geometric Constraints: Planning for Solving Complex Tasks, Reducing Uncertainty, and Generating Informative Paths & Policies. Seattle, WA, May 2015.

177. C. Rebhuhn, R. Skeele, J. J. Chung, G. A. Hollinger, and K. Tumer. Promoting cooperative behavior between cost-based planners. Proceedings of the ICRA 2015 Workshop Taxonomies of Interconnected Systems: Asymmetric Interactions in Distributed Robotics. Seattle, WA, May 2015.

178. R. Skeele, J. J. Chung, G. A. Hollinger, and K. Tumer. Risk aware graph search with uncertain edge costs. Proceedings of the ICRA 2015 Workshop Beyond Geometric Constraints: Planning for Solving Complex Tasks, Reducing Uncertainty, and Generating Informative Paths & Policies. Seattle, WA, May 2015.

179. W. Curran, A. Agogino, and K. Tumer. Agent Partitioning with Reward/Utility-Based Impact. *AAAI-2015 Workshop on Multiagent Interaction without Prior Coordination,* Austin, TX, January 2015.

180. C. HolmesParker and M. Taylor and Y. Zhan and K. Tumer Exploiting Structure and Agent-Centric Rewards to Promote Coordination in Large Multiagent Systems. *AAMAS-2014 Workshop on Adaptive and Learning Agents,* Paris, France, May 2014.

181. C. Rebhuhn, M. Knudson and K. Tumer. Announced Strategy Types for Multiagent RL for Conflict-Avoidance in the National Airspace. *AAMAS-2014 Workshop on Adaptive and Learning Agents,* Paris, France, May 2014.

182. M. Colby, M. Knudson and K. Tumer. Multiagent Flight Control in Dynamic Environments with Cooperative Coevolutionary Algorithms. *AAAI Spring Symposium,* Stanford, CA, March 2014.

183. M. Colby, C. Holmes Parker and K. Tumer. Coordination and Control for Large Distributed Sensor Networks. *Future of Instrumentation International Workshop (FIIW-2012)*, Gatlinburg, Tennessee, October 2012.

184. S. Sills and K. Tumer. Neuroevolutionary Control of a Multi-linked Inverted Pendulum with a Large Number of Agents. *AAMAS-2012 workshop on Autonomous Robots and Multirobot Systems*, Valencia, Spain, June 2012.

185. M. Colby and K. Tumer. Performance and Fiscal Analysis of Distributed Sensor Networks in a Power Plant *AAMAS-2012 workshop on Agent Technologies for Energy Systems*, Valencia, Spain, June 2012.

186. L. Yliniemi and K. Tumer. Coevolution and Transfer Learning in a Heterogeneous, Point-to-Point Fleet Coordination Problem. *AAMAS-2012 workshop on Agents in Traffic and Transportation*, Valencia, Spain, June 2012.

187. Carrie Rebhun, Brady Gilchrist, Sarah Oman, I. Tumer, R. Stone and K. Tumer. A Multiagent Framework for Component-Level Creativity Evaluation. *AAMAS-2012 workshop on Multi-Agent Based Simulation*, Valencia, Spain, June 2012.

188. L. Yliniemi and K. Tumer. Extending the Difference Reward to Multi-Objective Congestion Problems. *AAMAS-2012 workshop on Optimisation in Multi-Agent Systems*, Valencia, Spain, June 2012.

189. C. Holmes Parker and K. Tumer. Combining Difference Rewards and Hierarchies for Scaling to Large Multiagent System. *AAMAS-2012 workshop on Adaptive and Learning Agents*, Valencia, Spain, June 2012.

190. A. Iscen and K. Tumer. Multiagent Learning of Choices via Simpler MDPs and Reward Shaping. *AAMAS-2012 workshop on Adaptive and Learning Agents*, Valencia, Spain, June 2012.

191. C. Rebhuhn and K. Tumer. Fast Multiagent Learning from Actions Not Taken for Heterogeneous Agent. *AAMAS-2012 workshop on Adaptive and Learning Agents*, Valencia, Spain, June 2012.

192. S. Proper and K. Tumer. Graphical Models in Continuous Domains for Multiagent Reinforcement Learning. *AAMAS-2012 workshop on Adaptive and Learning Agents*, Valencia, Spain, June 2012.

193. A. Iscen, C. Holmes Parker and K. Tumer. Decreasing Communication Requirements for Agent Specific Rewards in Multiagent Learning. *AAMAS-2011 workshop on Adaptive and Learning Agents*, Taipei, Taiwan, May 2011.

194. M. Knudson and K. Tumer. Policy Search and Policy Gradient Methods for Autonomous Navigation. *AAMAS-2010 workshop on Adaptive and Learning Agents*, Toronto, Canada, May 2010.

195. K. Tumer and J. Lawson. Multiagent Coordination for Multi Resource Job Scheduling. *AAMAS-2009 workshop on Adaptive and Learning Agents*, Budapest, Hungary, May 2009.

196. D. Hennes, K. Tumer and K. Tuyls. A multiagent approach to hyper-redundant manipulators. *AAMAS-2008 Workshop on Learning and Adaptive Agents*. Estoril, Portugal, May 2008.

197. M. Knudson and K. Tumer. Effective Policies for Resource Limited Agents. *AAMAS-2007 Workshop on Learning and Adaptive Agents*. Honolulu, HI, May 2007.

198. K. Tumer, and A Agogino. Agent Reward Shaping for Alleviating Traffic Congestion **(Invited Paper)**. *AAMAS-2006 Workshop on Agents in Transportation and Traffic*. Hakodate, Japan, May 2006.

199. S. Airiau, K. Tumer, and A Agogino. Learning agents for distributed and robust spacecraft power management. *AAMAS-06 Workshop on Adaptation and Learning in Autonomous Agents and Multiagent Systems*. Hakodate, Japan, May 2006.

200. K. Tumer and A. Agogino. Efficient Reward Functions for Adaptive Multi-Rover Systems. *AAMAS-2005 Workshop on Coordination in Large Scale Multiagent Systems*. Utrecht, Netherlands, July 2005.

201. A. Agogino and K. Tumer. Multiagent Reward Analysis for Learning in Noisy Domains. *AAMAS-2005 Workshop on Learning and Adaptation in Multiagent Systems*. Utrecht, Netherlands, July 2005.

202. K. Tumer. Coordination in large multiagent systems. *AAMAS-2004 Workshop on Challenges in the Coordination of Large Scale Multiagent Systems*. New York, NY, July 2004.

203. S. Airau, S. Sen, D. H. Wolpert, and K. Tumer. Providing effective access to shared resources: A COIN approach. *AAMAS-2003 Workshop on Engineering Self-Organizing Systems*. Melbourne, Australia, July 2003.

204. D. H. Wolpert and K. Tumer. Beyond mechanism design. *ICM Game Theory Conference, "Heterogeneous and Social Games" Special Session*. Qingdao, China, August 2002.

205. D. H. Wolpert and K. Tumer. Overview of design of collectives. *Robosphere 2002: Self Sustaining Robotic Ecologies*, pages 11–16, Moffett Field, CA., November 2002.

206. J. Ghosh and K. Tumer. Ensemble techniques for data mining in heterogeneous environments. *Institute for Operations Research and the Management Sciences Conferences*, San Antonio, TX, November 2000.

207. D. H. Wolpert and K. Tumer. Reinforcement learning in distributed domains: An inverse game theoretic approach. *2001 AAAI Spring Symposium on Game Theoretic and Decision Theoretic Agents*, Stanford, CA, March 2001.

208. D. H. Wolpert and K. Tumer. Illustration of the COIN approach to the design of multiagent systems. *AGENTS-00/ECML-00 Workshop on Learning Agents*, Barcelona, Spain, June 2000.

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210. D. H. Wolpert and K. Tumer. Collective intelligence. *Fourth Workshop on Economics with Heterogeneous Interacting Agents*, Genoa, Italy, June 1999.

211. D. H. Wolpert and K. Tumer. Collective intelligence for optimization. *IJCAI-99 Workshop on Statistical Machine Learning for Large Scale Optimization*, Stockholm, Sweden, July 1999.

212. D. H. Wolpert, K. Tumer, and A. M. Bell. Collective intelligence for network routing. *AAAI-99 Workshop*, Orlando, FL, July 1999.

213. A. M. Bell, W. Sethares, D. Lucking-Reiley, D. H. Wolpert, K. Tumer, and J. Frank. Strategic behavior, learning and the efficient allocation of network resources. *International Congress on Networks, Groups and Coalitions*, Manresa, Spain, May 1999.

214. K. Tumer and J. Ghosh. Classifier combining: Analytical results and implications. *Integrating Multiple Learned Models for Improving and Scaling Machine Learning Algorithms, workshop at the Thirteenth National Conference on Artificial Intelligence*, Portland, OR, August 1996.

Thesis/Dissertation:

215. K. Tumer. *Linear and Order Statistics Combiners for Reliable Pattern Classification*. PhD Dissertation, The University of Texas, Austin, TX, May 1996.

216. K. Tumer. *Structural adaptation and generalization in neural networks*. Master's Thesis, The University of Texas, Austin, TX, August 1992.