
Anita Raja

Department of Computer Science, Hunter College and The Grad Center
City University of New York,
695 Park Avenue, NY, NY 10065
Email: anita.raja@hunter.cuny.edu

Research Interests:
Artificial Intelligence, Multiagent Systems, Machine Learning, Decision Support Systems and Complex Agent Networks

1. Education

Doctor of Philosophy, Computer Science
University of Massachusetts, Amherst, September 2003
Dissertation title: *Meta-Level Control in Multi-Agent Systems*
Advisor: Professor Victor Lesser
Committee Members: Professor Shlomo Zilberstein, Professor Andrew Barto, Professor Abhijit Deshmukh

Master of Science, Computer Science
University of Massachusetts, Amherst, September 1998
Thesis title: *Reasoning about Uncertainty in Design-to-Criteria Scheduling*
Advisor: Professor Victor Lesser

Bachelor of Science (Honors) in Computer Science and minor in Mathematics
With Honors, Summa Cum Laude
Temple University, Philadelphia, February 1996

2. Professional Appointments

August 2019-Present	**Professor of Computer Science** Department of Computer Science Hunter College and The Grad Center, The City University of New York
August 2014-August 2019	**Professor of Computer Science** **Associate Dean of Research and Graduate Programs,** Albert Nerken School of Engineering, The Cooper Union for the Advancement of Science and Art
July 2009- June 2014	**Associate Professor**, Software and Information Systems, University of North Carolina at Charlotte.
January 2011 – June 2012	**Visiting Research Scientist, (on sabbatical from UNCC).** Center for Computational Learning Systems, Columbia University.
Aug 2003- June 2009	**Assistant Professor**, Software and Information Systems, University of North Carolina at Charlotte.
Aug 1996-June 2003	**Graduate Research Assistant**, Multi Agent Systems Lab, University of Massachusetts.
January 1999	**Lecturer**, Computer Science, University of Massachusetts.
Feb 1995- May 1996	**Undergraduate Research Assistant**, FLAIRS Lab, Computer and Information Sciences, Temple University.
Aug 1993-May 1996	**Tutor**, Mathematics, Temple University.

3. Awards and Distinctions

- Association for the Advancement of Artificial Intelligence (AAAI) Senior Member, 2023.
- Member of winning team of the NIH NICHD 2021 Decoding Maternal Morbidity Challenge Prize.
- Named in inaugural issue of Crain's New York 2019 Notable Women in Tech, https://www.crainsnewyork.com/awards/notable-women-tech-2019-anita-raja-phd.
- Best Paper Award, *IEEE/WIC/ACM International Joint Conference on Intelligent Agent Technology 2010, Toronto, Canada* Shanjun Cheng, Anita Raja, Linda Xie, Ivan Howitt, "DLB-SDPOP: A Multiagent Pseudo-tree Repair Algorithm for Load Balancing in WLANs (Acceptance Rate 18.8%).
- Essam El-Kwae 2006 UNCC College of IT Student-Faculty Research Award (with undergraduate student George Alexander).
- Nominee (1 of 3) for Best Paper Award, *IEEE/WIC/ACM International Joint Conference on Intelligent Agent Technology 2004, Beijing, China* Anita Raja and Victor Lesser, "Meta-level Reasoning in Deliberative Agents, Beijing, China, September 2004. pp 141-147. (Acceptance rate 16%).
- UMass Amherst: AAAI Student Scholarship to participate in AAAI 2002, Edmonton, Canada; NSF/Intel/AAAI grant to attend Grace Hopper Celebration of Women in Computing, Cap Cod, MA. September 2000; NSF Student Scholarship to attend ICMAS 2000, Boston. July 2000; NSF/DARPA Scholarship awarded to student first authors with accepted publication at Agents 2000 to participate in the conference, Barcelona, Spain. June 2000; NSF Scholarship to attend EASSS 1999 (European Agent Systems Summer School) in University of Utrecht, Netherlands.
- Temple University: B.S degree summa cum laude with University Honors and Distinction in Major, Presidential Award for academic excellence, Spring 1996, Best Teaching Assistant Award at Spring 1996, Member of Phi Beta Kappa Honor society, Member of Golden Key National Honor Society, Recipient of Temple University's International Student Scholarship, Spring 1995.
- High School: Scored 99.9 percentile in the All India Senior School Examination (March 1992) with 100/100 in Computer Science and a total of 480/500 (1,000,000+ students took the board exam).

4. Extramural Funding

1. **PSC-CUNY Enhanced Grant, "**A Pipeline for Unsupervised Bayesian Structure Learning Under Uncertainty", Principal Investigator: Anita Raja, July 2023-June 2024, $12,000.
2. **National Science Foundation "**Planning: CRISES: Center for Urban Climate Adaptation Solutions", Senior Personnel, Sep 2023-Aug 2024, Lead: Cornell University, $99,999.
3. **CUNY 2023 Planning Grant for "**Predicting Transformation of Living Systems in Evolving Environments" Mandë Holford, Weigang Qiu, John Dennehy, and **Anita Raja,** Hunter College: John Dennehy & Sebastian Alvarado – Queens College, February 2023-January 2024, Total: $20,000.
4. **National Science Foundation "**SHF: Small: Practical Analyses and Safe Transformations for Imperative Deep Learning Programs", Principal Investigator: Raffi Khatchadourian; Co-Principal Investigator: **Anita Raja,** May 23, 2022-May 31, 2025, Total**:** $599,974.00.
5. **National Institute of Health 3**R01 **"**SCH: Prediction of preterm birth in Nulliparous Women", Principal Investigator: Ansaf Salleb-Aouissi; Co- Principal Investigators: Alex Friedman, Itsik Pe'er, **Anita Raja,** Ron Wapner**,** September 16, 2020- July 31, 2021, Total: $172,531.
6. **PSC-CUNY Enhanced Grant,** A Multiagent Approach for Efficient Traffic Management**,** Principal Investigator: Anita Raja, July 2020-June 2022, $12,000.
7. **National Institute of Health 5**R01 **"**SCH: Prediction of preterm birth in Nulliparous Women", Principal Investigator: Ansaf Salleb-Aouissi; Co- Principal Investigators: Alex Friedman, Itsik Pe'er, **Anita Raja,** Ron Wapner**,** September 2019- August 2024, $999,771.
8. **Institute of Design and Construction, "**Art, Architecture, Construction, and Engineering (AACE) Lab", Co-authored Winning Interdisciplinary Proposal with Associate Dean of Architecture and Director of Development, May 2018 – Dec 2019, $2,000,000.
9. **Naval Postgraduate School** "Modeling Uncertainty and its Implications in Complex Interdependent Networks", Principal Investigator: **Anita Raja,** 2/10/2015-2/9/2017, $119,832.

10. **National Science Foundation "**EAGER: Collaborative Research: Advanced Machine Learning for Prediction of Preterm Birth", Principal Investigator: **Anita Raja,** 9/1/2014-8/31/2017, $30,643 (Total funding with collaborator Columbia University $206,100).
11. **Department of Education "**The UNC Charlotte 2013-2016 GAANN Fellowship Program in Computing and Informatics", Principal Investigator: **Anita Raja**, Co-Principal Investigators: Zbyszek Ras, Jamie Payton 8/16/13-8/15/16, $824,531 (Federal: $659,625; Non-Federal: $164,906). Handed over PI role in July 2014 when I left UNCC.
12. **National Science Foundation** "Doctoral Mentoring Consortium at the Twelfth International Conference on Autonomous Agents and Multi-Agent Systems", Principal Investigator: **Anita Raja,** 5/15/2013-4/30/2014, $20,000.
13. **Naval Postgraduate School** "Leveraging Structural Characteristics of Interdependent Networks to Model Non-linear Cascading Risks", Principal Investigator: **Anita Raja,** 2/10/2013-6/4/2014, $119,010.
14. **CRA-W/CDC** Discipline-specific Mentoring Workshop at AAMAS 2013, Principal Investigator: **Anita Raja;** Co-Principal Investigators: Maria Gini, Stephen Guy, 8/15/2012-8/15/2013, $17,000.
15. **Naval Postgraduate School** "Modeling Non-linear Cascading Consequences in Interdependent Networks", Principal Investigator: **Anita Raja,** 5/24/2011-12/31/2012, $119,986.
16. **National Science Foundation** REU Supplement for "RI: Small: A Hybrid Approach For Meta-Level Control Across Agent Boundaries, Principal Investigator: **Anita Raja,** 9/16/2012-12/31/2013, $16,250 (Supports 2 undergraduate students).
17. **National Science Foundation** "RI: Small: A Hybrid Approach For Meta-Level Control Across Agent Boundaries, Principal Investigator: **Anita Raja,** 9/16/2010-12/31/2013, $151,403
18. **Purdue University** "Proposal to Establish a Center of Excellence for Command, Control and Interoperability", Principal Investigator: William Ribarsky; Co-Principal Investigators: Jianping Fan, **Anita Raja,** Robert Kosara, Jing Yang, 07/01/2009-06/30/2013 $289,667.
19. **Georgia Institute of Technology** "Career Development Grant – Advanced Data Analysis and Visualization" Principal Investigator: William Tolone; Co-Principal Investigators: Jianping Fan, Robert Kosara, **Anita Raja,** William Ribarsky, Jing Yang, 6/18/2009-9/25/2011, $192,778.
20. **Battelle Memorial Institute** "Regional Visualization and Analytics Center", Principal Investigator: William Ribarsky; Co-Principal Investigators: **Anita Raja,** William Tolone, Jianping Fan, Robert Kosara, Jing Yang, 01/01/2006-06/30/2009 $1,892,486.
21. **National Science Foundation** "NETS-NBD**:** WLAN Resource Management Using Multi-Agent Systems", Principal Investigator: Linda Xie; Co-Principal Investigators: Ivan Howitt, **Anita Raja**, 09/01/2006-08/31/2008, $75,000.
22. **DARPA IPTO** Program "COORDINATORs: Intelligent Coordination Support for Humans" Principal Investigator: **Anita Raja**, Sub-contractor to Honeywell International, Inc. (DARPA/AFRL Prime), 2/11/2005-8/31/2007, $272,500.
23. **Defense Intelligence Agency**, "Sudden Capital Real-World Model Extensions" Principal Investigator: William J. Tolone; Co-Principal Investigators: Wei-Ning Xiang, Gail-Joon Ahn, David Wilson, **Anita Raja**, and Seok-Won Lee, 11/12/2004 – 12/21/2005 $3,151,218.
24. **Defense Intelligence Agency**, "Sudden Capital Real-World Model Extensions" Principal Investigator: William J. Tolone; Co-Principal Investigators: Wei-Ning Xiang, David Wilson, **Anita Raja**, 11/12/2004 – 3/31/2005 $264,606.
25. **National Science Foundation** SFS Capacity Building Proposal "Collaborative Project: Bridging Gaps in IA Education through Collaboration" Principal Investigator: Bill Chu; Co-Principal Investigators: Seok-Won Lee, Gail-Joon Ahn, **Anita Raja**, Yuliang Zheng, Yongge Wang, William Tolone, Zhaoyu Liu, and David Wilson, 08/15/04 - 07/31/06. $300,000.
26. **National Security Agency** "Department of Information Assurance Scholarship Program" Principal Investigator: Gail-Joon Ahn; Co-Principal Investigators: Bill Chu, William Tolone, Yuliang Zheng, Yongge Wang, Zhaoyu Liu, David Wilson, **Anita Raja**, Seok-Won Lee, Teresa Dahlberg. 09/17/2004-09/16/2005. $118,104.
27. **DOD DN Space and Naval Warfare Systems Command (SPAWAR) "**Critical Infrastructure Protection Center Initiative: Critical Infrastructure Data Acquisition and Impact Modeling, ". Principal Investigator: William J. Tolone; Co-Principal Investigators: Bei-Tseng Chu, David Wilson, **Anita Raja**, and Wei-Ning Xiang 6/24/2004-9/30/2004, $9582.

28. **Defense Intelligence Agency**, "Sudden Capital Real-World Model Construction, Validation, and Verification". Principal Investigator: William J. Tolone; Co-Principal Investigators: David Wilson, **Anita Raja**, and Wei-Ning Xiang. 4/15/04-9/30/04. $424,536.
29. **Defense Intelligence Agency**, "Model Capability Demonstration". Principal Investigator: William J. Tolone; Co-Principal Investigators: David Wilson, **Anita Raja**, and Wei-Ning Xiang. 4/15/04-9/30/04. $170,732.
30. **Defense Intelligence Agency**, "Critical Infrastructure Modeling for Effect-based Operation", Principal Investigator: William J. Tolone; Co-Principal Investigators: Bei-tseng Chu, Wei-Ning Xiang, Mirsad Hadzikadic, David Wilson, **Anita Raja**, and Teresa A. Dahlberg. 7/15/2003-4/15/2004. $725,468.

5. Career Highlights

Research

- PI/Co-PI for peer-reviewed NSF, NIH, ONR, DHS, PNL, DOD

totaling over $10M with over $2M as PI. Several of the collaborative grants involved cross-cutting ideas with fields like Medicine, Visual Analytics, Political Science and Electrical Engineering.

- Currently leading research in Machine Learning for Disease Risk Stratification and Game Theoretic Methods for Traffic Network Optimization.
- Internationally recognized expert on the topic of Meta-level Control in Multiagent Systems; Led efforts in establishing Metareasoning as a core research area in Artificial Intelligence. Co-chaired several workshops on the topic at premier AI conferences (AAMAS, AAAI).
- Co-Editor of MIT Press book textbook titled Metareasoning: Thinking about Thinking, 2011.
- Publications include 7 journal articles, 25 peer-reviewed conference publications, 9 book chapters with over 1500 citations (~500 in past 5 years) and an h-index of 18.
- Best Paper Award, "DLB-SDPOP: A Multiagent Pseudo-tree Repair Algorithm for Load Balancing in WLANs" co-authored with Shanjun Cheng, Linda Xie and Ivan Howitt and published at the Intelligent Agent Technology Conference (IAT) 2010 as part of the Ninth IEEE/WIC/ACM International Joint Conference on Intelligent Agent Technology and Web Intelligence.
- Consultant on ARUP's blockchain initiative.

Teaching

- Designed and taught (S2020, F2022) large lecture version of Advanced Data Structures and Algorithms at Hunter College.
- Coordinator for 5 sections of the freshmen required course in Engineering Design and Problem Solving (2018 onwards). Instructor for the course since 2016-2018.
- Designed and taught course on Distributed AI for Blockchain Applications in Spring 2018 in addition to Engineering Design and Problem Solving which focused on Engineering Solutions for Global Health. The courses are designed to cater to students from all engineering majors.
- Project Director for Cooper Union's MOOCs funded by the edX High School Initiative: Advanced Placement MOOCs in Computer Science and CLEP MOOC in Chemistry, and 2014
- A strong teaching record demonstrated through teaching evaluations and peer reviews.
- Best Teaching Assistant Award at Temple University, Spring 1996.
- Committed to mentoring undergraduates having supervised ten undergraduates. These included five senior projects and two NSF-funded REU students. Along with undergraduate George Alexander, I received the CCI 2006 Essam El-Kwae Student-Faculty research award that recognizes productive undergraduate mentoring efforts and joint publications.
- Committed to graduate education having supervised eight MS students (two as chair) and six Ph.D.-level students (3 as chair, 1 graduate). Students I directly supervised were mostly funded by my external grants. One advisee is the 2006 TIAA-CREF fellowship recipient and another is the first author of a best paper award mentioned above.
- Organized the popular CCI 8-hour start-up, a web-based application design and programming competition for undergraduate and graduate students (2010).
- Primary Organizer of the First CRA-W/CDC Discipline-Specific Mentoring Program for promising undergraduates from under-represented groups on Autonomous Agents and MultiAgent Systems, May 6-10, 2013, St Paul, Minnesota.

- PI and Director of DOE-funded CCI 2013-2016 GAANN fellowship program to increase number of qualified researchers and teachers in computing (Director from August 2013-July 2014 when I left UNCC).

Service

- AAAI Executive Council Member, 2022- Present; US Policy Sub-Committee, Membership Sub-Committee.
- AAAI Diversity and Inclusion Committee 2020-Present.
- External service through serving on the journal editorial review boards; proposal review panels for the NSF and other international funding agencies; Senior Program committee member for top tier conferences in Artificial Intelligence; and Reviewer for multiple top tier journals and conferences, Organizing Committee of AAAI-Undergraduate Consortium 2021;
- CUNY faculty ambassador on the National Council for AI, a consortium of academia, industry partners including Microsoft, Citibank, NASDAQ and the Brookings Institution that led the discourse on governance and student/employee training requirements for Responsible AI in FinTech.
- Hunter College: Faculty Senator.
- Cooper Union: Member of President's Cabinet, Academic Leadership Team, Diversity Committee, Exhibitions Committee, Member of Middle States Working Group for Standard VI : Planning, Resources, and Institutional Improvement. (Spring 2018 Visit).
- UNCC: Six University-level, eleven College-level and twelve committees department committees. Served as Chair of College-level Honors Committee (2008-2010), SIS Ph.D. committee track chair (2004-2006), Chair of the SIS graduate committee (2005—2006), Chair of SIS Academic Planning Committee (2009-20010), Chair of Ad-hoc Committee to establish core courses for SIS Ph.D. curriculum (2009-2010).

Academic Administration and Leadership (2014-2019)

Albert Nerken School of Engineering is a top ranked Engineering school that offers ABET- accredited degree programs in civil, chemical, mechanical and electrical engineering. It has about 600 students (75+ graduate students) and 35 full-time faculty. As Associate Dean of Research and Graduate Programs, key accomplishments include

- Co-leading Deans office efforts for successful November 2018 ABET Accreditation Visit.
    - Attended ABET EAC 2018 Institutional Representative Orientation in Baltimore, June 2018.
    - All four engineering programs were successfully accredited in August 2019.
- Leading efforts to design a high-quality leading edge program in Computation and potentially Computer Science major at the Cooper Union Summer 2018- Present.
- Engineering PI for Institutional initiative on implementation of "Art, Architecture, Construction, and Engineering (AACE) Lab" funded by grant from Institute of Design and Construction, Summer 2017-Present.
- Spearheaded and established MOA for semester exchange and joint research with Icahn School of Medicine, Summer 2018. Promoted and secured funds for Cooper student participation at ISSMS annual hackathon 2017, 2018.
- Engaged in discussions for creation of Computer Science Minor and Bioengineering Minor. Computer Science Minor successfully established in Spring 2019.
- Member of President's Cabinet (2014-2019t): Involved in Institutional-level Discussions and decision-making.
- Strategic planning and oversight of graduate program:
    - clarification of established policies and procedures for the existing thesis option and creating new ones for the recently introduced non-thesis option, local and international recruitment, improving retention and graduation rates, creating a new graduate handbook.
- Implementing steps to promote interdisciplinary research http://cooper.edu/engineering/research.
    - Interfacing with Cooper's C.V. Starr Research Foundation and Development to facilitate industry partnerships.
    - Working on processes and protocols for industry collaborations including developing Intellectual Property and Conflict of Interest policies with a team.
    - Provide faculty with College-level support and documents for grant submission to federal agencies.

- Liasing with Development to manage endowments and to seek and secure funding to support faculty and student scholarly activities from private organizations, non-profits and individual donors. Assisted in developing reporting mechanism for funded projects. Secured
- Initiated and organized the annual 3 Minute "March" madness faculty seminars beginning in 2015 through 2019 where engineering faculty present their research in a rapid-fire session (3 minutes for each faculty). Audience include faculty, staff and students from all three schools.
- Initiated and organized a research focus series "From the Lab: Current Research at the Cooper Union" to highlight the current interdisciplinary research by faculty and students at the Albert Nerken School of Engineering. Topics include Bioengineering (February 2016), Sustainability (November 2016) and Energy, Environment and Fuel (February 2017). Guests include alumni, donors and other supporters of Cooper.
- Facilitated the establishment of the first Bioengineering Summer Undergraduate Research Fellowship (SURP) program in the summer of 2014 and the 2014-2015 Research Scholars Program.
- Organized two successful Engineering End of Year Shows in 2016, 2017, 2018 and 2019 that have helped highlight engineering research https://cooper.edu/engineering/research/CUEOYS. Engineering began participation in the school-wide EOYS in 2014.
- Faculty advisor for HackCooper 2018.

- Oversight of study abroad program which is primarily summer research abroad.
  - currently includes 4 countries and 6 schools including the implementation of the semester exchange program between Cooper and Indian Institute of Technology, Bombay. Initiated partnership with Karlsruhe University in Germany to provide DAAD grants to fund Cooper students travel and provide partial scholarships for their study abroad experience at Karlsruhe.
- Interface with Development and Alumni Affairs to promote programs at events and Career Services for student placement; presented at high school recruitment and alumni events.
  - Coordinator for our freshmen Engineering design and problem solving course (EID 101).
  - Successfully worked with development to secure 10K in alumni support for 2018 and 2019.
- Premed Advisor, March 2015 – August 2019: Student Advising on courses, REU and research options; Chaired MCAT informational sessions and premed career panels; Establishing partnerships with local medical schools.
- As Project Director for an edX funded MOOC project, responsible for planning and implementation of end-to-end year long process that included interfacing with edX staff, hiring and collaborating with an external video production company, lecturers, publishers and students to produce and meet the deadlines for two 16 week Cooper Union MOOC courses (AP Computer Science and CLEP Chemistry) simultaneously. Over 10000 students enrolled in each of the 2 courses over multiple offerings.
- Leadership Training
  - Participant in Harvard University Graduate School of Education "Women in Education Leadership" Conference March 3-5th, 2019, Boston, MA.
  - Participant in the 2012 -2013 Leadership UNC Charlotte Program hosted by the ADVANCE Faculty Affairs Office. Nominated by Dean Deng to attend this program that offers department chairs and other current and emerging leaders an opportunity to explore and seek solutions to some of the pressing challenges that they confront.

6. Refereed Publications (Current and Under Review)

Books

[B2] Michael T. Cox and **Anita Raja,** (Editors) 2011**.** *MetaReasoning: Thinking about Thinking* MIT Press, Cambridge, MA (ISBN-10 0-262-01480-7).

[B1] Paula Goolkasian, Ted Carmichael, Marvin Croy, Mark Faust, Boyd Davis, Heather Lipford, Mirsad Hadzikadic, Anita Raja, and Lori Van Wallendael, *Cognitive Science: An Interactive Approach*, 2011, National Social Science Press.

Highly Refereed Journals

[J13] Arezoo Bybordi, Matt DiCicco*, **Anita Raja** and Ana Bazzan, "CHIDYN: a clustering-based hierarchical approach for dynamic traffic assignment", To appear in Proceedings of Transportation Research Procedia, October 2023.

[J12*] Irene Tang, Daniel Mallia, Qi Yan, Itsik Pe'er, Anita Raja, Ansaf Salleb-Aouissi, Ron Wapner, " A Scoping Review of Preterm Birth Risk Factors, *American Journal of Perinatology*, 2023 Sep 25. doi: 10.1055/s-0043-1775564.

[J11] Qi Yan, Rafael Guerrero, Raiyan Khan, Andy Surujnarine, Ronald Wapner, Matthew Hahn, **Anita Raja**, Ansaf Salleb-Aouissi, William Grobman, Hyagriv Simhan, Nathan Blue, Robert Silver, Judith Chung, Uma Reddy, Predrag Radivojac, Itsik Pe'er, David Haas "Searching and visualizing genetic associations of pregnancy traits by using GnuMoM2b", *Genetics*. 2023 Oct 4;225(2):iyad151. doi: 10.1093/genetics/iyad151.

[J10] Di Mei*, I-An Huang*, Anita Raja, Mohammad Rashedul Hasan & Ana L.C. Bazzan (2022): Traffic optimization using a coordinated route updating mechanism, Journal of Intelligent Transportation Systems, 2022 27:5, 626-642. pp DOI: 10.1080/15472450.2022.2074791 (Impact Factor (2020): 4.277)

[J9] Yaroslava Shynkar*, **Anita Raja**, Ana Bazzan and Marin Marinov* "Multiagent Meta-level Control for Adaptive Traffic Systems: A Case Study", Transportation Research Procedia, Volume 62, 2022, Pages 236-244.

[J8] Mohammad Hasan, **Anita Raja** and Ana Bazzan, "A Context-aware Convention Framework for Large-Scale Networks", Autonomous Agents and Multi-Agent Systems (March 2019), 33(1-2): pp 1-34 https://doi.org/10.1007/s10458-018-9397-9.

[J7] Shanjun Cheng, **Anita Raja** and Linda Xie, "Dynamic Multi-agent Load Balancing Using Distributed Constraint Optimization Techniques", In Web Intelligence and Agent Systems: An International Journal (WIAS), IOS Press, Netherlands, Vol 12, Number 2, pp 111-138, 2014.

[J6] Shanjun Cheng, **Anita Raja** and Victor Lesser, "Multiagent Meta-level Control for Radar Coordination", In Web Intelligence and Agent Systems: An International Journal (WIAS), IOS Press, Netherlands, Vol. 11, Number 1, pp 81-105, 2013.

[J5] Anita Raja and Victor Lesser, "A Framework for Meta-level Control in Multi-Agent Systems", In Autonomous Agents and Multi-Agent Systems, Vol.15, Number 2, pp 147-196, October 2007, DOI 10.1007/s10458-006-9008-z, URL http://dx.doi.org/10.1007/s10458-006-9008-z.

[J4] Thomas Wagner, **Anita Raja**, and Victor Lesser, "Modeling Uncertainty and its Implications to Sophisticated Control in TAEMS Agents", In Autonomous Agents and Multi-Agent Systems, Vol. 13, Number 3, pp 235-292, Nov 2006, DOI 10.1007/s10458-006-7669-2, URL http://dx.doi.org/10.1007/s10458-006-7669-2.

[J3] V. Lesser, K. Decker, T. Wagner, N. Carver, A. Garvey, B. Horling, D. Neiman, R. Podorozhny, M. NagendraPrasad, **Anita Raja**, R. Vincent, P. Xuan, X.Q. Zhang, "Evolution of the GPGP/TAEMS Domain-Independent Coordination Framework", In Autonomous Agents and Multi-Agent Systems, Vol. 9, p 87-143, 2004.

[J2] Victor Lesser, Bryan Horling, Frank Klassner, **Anita Raja**, Thomas Wagner, Shelley XQ. Zhang, "BIG: An Agent for Resource-Bounded Information Gathering and Decision Making", *Artificial Intelligence, Issue on Internet Applications*, May-2000, Vol 118, issue 1-2, pages 197-244.

[J1] Victor Lesser, Bryan Horling, **Anita Raja**, Thomas Wagner, Shelley XQ. Zhang. "Resource-Bounded Searches in a Information Marketplace", *IEEE Internet Computing, Agents on the Net* Mar/Apr 2000, Vol 4, Number 2., p 49-58.

Refereed Book Chapters

[BC9] Anita Raja, Artificial Intelligence, Chapter 8, *Cognitive Science: An Interactive Approach*, Paula Goolkasian, (Ed.), National Social Science Press, El Cajon, CA, 2011.

[BC8] Michael T. Cox and **Anita Raja,** "Metareasoning: An Introduction", In *Metareasoning: Thinking about Thinking*, M. Cox & A. Raja, (Ed.). MIT Press, Cambridge, USA, pp 3-14, March 2011.

[BC7] George Alexander, **Anita Raja**, and David Musliner, "Controlling Deliberation in

Coordinators", In *Metareasoning: Thinking about Thinking*, M. Cox & A. Raja, (Ed.). MIT Press, Cambridge, USA, pp 59-76, March 2011.

[BC6] Anita Raja, George Alexander**,** Victor Lesser and Michael Krainin. Coordinating Agent's Meta-level Control, In *Metareasoning: Thinking about Thinking*, M. Cox & A. Raja, (Ed.). MIT Press, Cambridge, USA, pp 201-216, March 2011.

[BC5] Jiang Xie, Ivan Howitt, and **Anita Raja**, "Framework for Decentralized Wireless LAN Resource Management," Chapter 2 of Emerging Wirelesss LANs, Wireless PANs, and Wireless MANs: IEEE 802.11, IEEE 802.15, 802.16 Wireless Standard Family, John Wiley & Sons, Inc., April 2009, pp 27-64.

[BC4] Anita Raja, Michael Barley and Shelley Xiaoqin Zhang "Towards Safe Coordination in MultiAgent Systems". LNAI Hot Topics Safety and Security in Multiagent systems: The Early Years, Pages 1-7, Volume: 4324 Editors: M. Barley, H. Mouratidis, A. Unruh , D. Spears, P. Scerri, F. Massacci, 2009.

[BC3] Anita Raja and Michael Klibanov "A Distributed Numerical Approach for Managing Uncertainty in Large-Scale Multi-Agent". LNAI Hot Topics Safety and Security in Multiagent systems: The Early Years, Pages: 75-84, Volume: 4324, Editors: M. Barley, H. Mouratidis, A. Unruh , D. Spears, P. Scerri, F. Massacci, 2009.

[BC2] Wei-ning Xiang, William J. Tolone, **Anita Raja**, David Wilson, Qianhong Tang, Kelli McWilliams, Robert McNally Mining Critical Infrastructure Information from Municipality Data Sets: A Knowledge-driven approach and its applications. Chapter 14 in Emerging Spatial Information Systems and Applications by Brian Hilton, Idea Group Publishing, 2006, pp 310-326.

[BC1] XiaoQin Zhang, **Anita Raja**, Barbara Lerner, Victor Lesser, Leon Osterweil and Thomas Wagner. "Integrating High-Level and Detailed Agent Coordination into a Layered Architecture", Lecture Notes in Computer Science (1887): Infrastructure for Scalable Multi-Agent Systems, Wagner/Rana editors, Springer-Verlag.

Highly Refereed Conference Publications

[C29] Raffi Khatchadourian, Tatiana Castro Vélez, Mehdi Bagherzadeh, Nan Jia, **Anita Raj**a, *"*Towards Safe Automated Refactoring of Imperative Deep Learning Programs to Graph Execution", IEEE/ACM 2023 International Conference on Automated Software Engineering (ASE) NIER track, pp *1800-1802* (Acceptance rate: 45/137 = 34%)

[C28] Tatiana Castro Velez, Raffi Khatchadourian, Mehdi Bagherzadeh, and **Anita Raja** Challenges in Migrating Imperative Deep Learning Programs to Graph Execution: An Empirical Study, MSR '22: Mining Software Repositories, 2022 (Acceptance rate: 45/137 = 34%)

[C27] Yiming Tang, Raffi Khatchadourian, Mehdi Bagherzadeh, Rhia Singh*, Ajani Stewart*, and **Anita Raja**, "An Empirical Study of Refactorings and Technical Debt in Machine Learning systems", In International Conference on Software Engineering, ICSE '21, pages 238–250. IEEE/ACM, IEEE, May 2021. (138/615; 22% acceptance rate).

[C26] Mohammad Hasan, **Anita Raja** and Ana Bazzan, "A Context-aware Convention Framework for Large-Scale Networks", Extended Abstract, *Proceedings of the Eighteenth International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2019), pp 1533-1535.*

[C25] Mohammad Hasan, Ana Bazzan, Eliyahu Friedman*, **Anita Raja**, "A Multiagent Solution to Overcome Selfish Routing In Transportation Networks", Proceedings of the IEEE 19th International Conference on Intelligent Transportation Systems (ITSC 2016), Rio De Janeiro, Brazil, Nov 1-3, 2016.

[C24] Ilia Vovsha, Ansaf Salleb-Aouissi, **Anita Raja,** Alex Rybchuk, Axinia Radeva, Ashwath Rajan, Yiwen Huang, Hatim Diab, Ashish Tomar, "Using Kernel Methods and Model Selection for Prediction of Preterm Birth", Proceedings of Machine Learning in Health Care, August 19-20 2016, Los Angeles, CA.

[C23] Mohammad Hasan and **Anita Raja** "Establishing Cooperation in Highly-Connected Networks Using Altruistic Agents", Proceedings of the IEEE/WIC/ACM Intelligent Agent Technology Conference 2015, December 6-9, 2015, Singapore.

[C22] Mohammad Hasan, **Anita Raja** and Ana Bazzan "Fast Convention in Dynamic Networks using Topological Knowledge" Proceedings of the Twenty-Ninth AAAI Conference on Artificial Intelligence (AAAI-15), pp 2067-2073, Jan 25-30, 2015, Austin, TX. (Acceptance Rate 26.67%)

[C21] Mohammad Rashedul Hasan, Sherief Abdallah and **Anita Raja**, "Topology Aware Convention Emergence", Proceedings of the 13th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2014), pp. 1593-1594 May 5- 9, 2014, Paris, France. (Acceptance Rate 46.2%).

[C20]Mohammad Rashedul Hasan and **Anita Raja**, "Emergence of Cooperation using Commitments and Complex Network Dynamics", Proceedings of the 2013 IEEE/ WIC/ ACM International Conference on Intelligent Agent Technology (IAT-2013), pp. 345-352, November 2013, Atlanta, Georgia (Acceptance Rate 30.7%).

[C19] Mohammad Rashedul Hasan and **Anita Raja**, "The Role of Complex Network Dynamics in the Emergence of Multiagent Coalition", Proceedings of the *Twenty-Seventh AAAI Conference on Artificial Intelligence*. 2013, Student Poster Abstract pp 1615-1616.

[C18] Shanjun Cheng, **Anita Raja** and Victor Lesser, "Using Conflict Resolution to Inform Decentralized Learning", Proceedings of the Twelfth International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2013), pp. 893-900, St. Paul, Minnesota (Acceptance Rate 23%).

[C17] Shanjun Cheng, **Anita Raja**, Linda Xie, Ivan Howitt, "DLB-SDPOP: A Multiagent Pseudo-tree Repair Algorithm for Load Balancing in WLANs", Proceedings of 2010 IEEE/ WIC/ ACM International Conference on Intelligent Agent Technology (IAT-2010), pp. 311-318, Toronto, Canada (Acceptance Rate 18.8%, **Received Best Paper Award).**

[C16] Shanjun Cheng, **Anita Raja** and Victor Lesser, "Multiagent Meta-level Control for a Network of Weather Radars " Proceedings of 2010 IEEE/ WIC/ ACM International Conference on Intelligent Agent Technology (IAT-2010), pp 157-164, Toronto, Canada. (Acc. Rate 18.8%)

[C15] Jia Yue, **Anita Raja** and Bill Ribarsky "Predictive Analytics Using a Blackboard-based Reasoning Agent", Short Paper in Proceedings of 2010 IEEE/ WIC/ ACM International Conference on Intelligent Agent Technology (IAT-2010), pp 97-100, Toronto, Canada. (Acceptance Rate 22.9%, Short Paper).

C14] Shanjun Cheng, **Anita Raja** and Victor Lesser, "Towards Multiagent Meta-level Control" In Proceedings of AAAI-2010, Student Abstract and Poster Program, pp 1925-1926, Atlanta, GA.

[C13] Dingxiang Liu, Jia Yue, Xiaoyu Wang, **Anita Raja**, William Ribarsky "The Role of Blackboard-based Reasoning and Visual Analytics in RESIN's Predictive Analysis", Proceedings of 2008 IEEE/ WIC/ ACM International Conference on Intelligent Agent Technology), pp 508-511, Sydney, Dec 9-12, 2008. (Acceptance Rate 29%, Short Paper)

[C12] George Alexander, **Anita Raja**, and David Musliner, "Controlling Deliberation in a Markov Decision Process-Based Agent", Proceedings of the Seventh International Joint Conference on Autonomous Agents and Multi-Agent Systems, pp 461-468, Estoril, Portugal, May 12-16, 2008 (Acceptance rate 22%).

[C11] Dingxiang Liu, **Anita Raja**, and Jayasri Vaidyanath, "TIBOR: A Resource-bounded Information Foraging Agent for Visual Analytics" Proceedings of 2007 IEEE/ WIC/ ACM International Conference on Intelligent Agent Technology (IAT 2007), pp 349-355, Silicon Valley, CA, Nov 2-5, 2007 (Acceptance rate 20%).

[C10] George Alexander, **Anita Raja** "The Role of Problem Classification in Online Meta-Cognition", Proceedings of the International Conference on Intelligent Agent Technology (IAT 2006), pp 218-225, Hongkong, China, December 2006 (Acceptance rate 25%).
[C9] Ivan Howitt, John Stamper, **Anita Raja**, Verghese Mappillai Predictive Protocol Management with Contingency Planning for Wireless Sensor Networks. Proceedings of the 2nd IEEE International Conference on Mobile Ad-hoc and Sensor Systems MASS 2005, p 160-162. (Short Paper)
[C8] Qianhong Tang, Wei-ning Xiang, William J. Tolone, **Anita Raja**, David Wilson, Kelli McWilliams, Robert McNally, (2005). A Knowledge-Driven Method for Critical Infrastructure Information Mining. *Association of American Geographers 101st Annual Meeting*, April 5-9, 2005, Denver, CO.
[C7] Wei-ning Xiang, William J. Tolone, **Anita Raja**, David Wilson, Qianhong Tang, Kelli McWilliams, Robert McNally, Mining Critical Infrastructure Information from Municipality Data Sets: A Knowledge Driven approach and its Applications. *Auto-Carto 2005*, Las Vegas, March 18-23rd, 2005.
[C6] Anita Raja and Victor Lesser. Meta-level Reasoning in Deliberative Agents. In *Proceedings of the International Conference on Intelligent Agent Technology (IAT 2004)*, September, 2004. **Best Paper Award Finalist, 1 of 3** finalists (Acceptance rate 16%).
[C5] William J. Tolone, David Wilson, **Anita Raja**, Wei-ning Xiang, E. Wray Johnson "Applying Cougaar to Integrated Critical Infrastructure Modeling and Simulation" *Proceedings of First Open Cougaar Conference* New York City, July 2004.
[C4] Anita Raja and Victor Lesser, "Efficient Meta-level Control in Bounded-Rational Agents", Proceedings of Autonomous Agents and Multi-Agent Systems 2003, pages 1104-1105, Melbourne, Australia. (Short paper)
[C3] Anita Raja, Victor Lesser and Thomas Wagner, "Toward Robust Agent Control in Open Environments", *Proceedings of Autonomous Agents 2000, pages 84-91, Barcelona, Spain*. Also UMass CS Tech Report 1999-59 (Acceptance Rate 24%).
[C2] Victor Lesser, Michael Atigetchi, Brett Benyo, Bryan Horling, **Anita Raja**, Regis Vincent, Thomas Wagner, Ping Xuan, Shelley XQ. Zhang. "The UMASS Intelligent Home Project", *Proceedings of Third International Conference on Autonomous Agents*, Seattle, WA, pages 291-298, Spring 1999. (Acceptance Rate 29%).
[C1] Victor Lesser, Bryan Horling, Frank Klassner, **Anita Raja**, Thomas Wagner, Shelley XQ. Zhang. "BIG: A Resource-Bounded Information Gathering Agent", *Proceedings of AAAI-98*, pages 539-546, Madison, WI, July 1998. (Acceptance Rate 30%).

Refereed Symposia and Workshop Publications

[W32] Anita Raja, Alisa Leshchenko and Jihie Kim, "Leveraging Conflict to Bridge Cognitive Reasoning and Generative Algorithms", AAAI 2023 Fall Symposium Series on Integrating Cognitive Architecture and Generative Models.
[W31] Jongoh Jeong*, Do Hyung Kwon*, Min Joon So*, Anita Raja, Shivani Ghatge, Nicolae Lari, Ansaf Salleb Aouissi "Using Privileged Information to Improve Prediction in Health Data: A Case Study", NeurIPS 2019 Workshop on Information Theory and Machine Learning.
[W30] Faiza Khattak, Ansaf Salleb-Aouissi, **Anita Raja**, "Accurate Crowd-labeling using Item Response Theory", Collective Intelligence, NYC, June 2016.
[W29] Anita Raja, Mohammad Hasan, Rob Flowe, Brendan Fernes, "Modeling Uncertainty and Its Implications in Complex Interdependent Networks", Proceedings of Naval Postgraduate Schools 13th Annual Acquisition Research Symposium, Monterey, CA, May 2016.
[W28] Anita Raja, Mohammad Hasan, Shalini Rajanna, Ansaf Salleb-Aouissi, "A Scalable Approach to Modeling Risk in the MDAP Network" Proceedings of Naval Postgraduate Schools 10th Annual Acquisition Research Symposium, pp 293-318, Monterey, CA.
[W27] Ilia Vovsha, Ashwath Rajan, Ansaf Salleb-Aouissi, **Anita Raja**, Axinia Radeva, Hatim Diab, Ashish Tomar and Ronald Wapner. "Predicting Preterm Birth is Not Elusive: Machine Learning Paves the Way to Individual Wellness", In Technical Report Series for AAAI 2014

Spring Symposium on “Big data becomes personal: Knowledge into Meaning” pp 82-89, March, 2014, Stanford, CA.

[W26] Ilia Vovsha, Ansaf Salleb-Aouissi, Axinia Radeva, Hatim Diab, Ashish Tomar, **Anita Raja,** Ronald Wapner, Mary McCord, Tara Randis. "Machine Learning Approaches for Prediction of Preterm Birth" at the Columbia University Institute for Data Sciences and Engineering (IDSE) Inaugural Symposium - “From Big Data to Big Ideas” April 5, 2013

[W25] Mohammad Rashedul Hasan and **Anita Raja**, “Emergence of Multiagent Coalition by Leveraging Complex Network Dynamics”, Proceedings of AAMAS 2013 Fifth International Workshop on Emergent Intelligence on Networked Agents (WEIN'13), pp 9-23, May 6-10, 2013, St. Paul, Minnesota.

[W24] Anita Raja, Mohammad Rashedul Hasan, Shalini Rajanna, Ansaf Salleb-Aoussi, "Leveraging Structural Characteristics of Interdependent Networks to Model Nonlinear Cascading Risks”, Proceedings of Naval Postgraduate Schools 10th Annual Acquisition Research Symposium, pp 137-152. Monterey, CA, 2013.

[W23] Anita Raja, Catriona Kennedy and Roger Hurwitz, "Socially Intelligent Agents to support Ethical Decision-making”, Short paper in Proceedings of AAMAS 2012 First International Workshop on Human-Agent Interaction Design and Models, pp 123-130, Valencia Spain, June 2012.

[W22] Anita Raja and Rashedul Hasan. “Facilitating Decision Choices with Cascading Consequences in Interdependent Networks”, Proceedings of Naval Postgraduate Schools 9th Annual Acquisition Research Symposium, pp197-220, Monterrey, CA, May 2012.

[W21] Doug Riecken, **Anita Raja**, Rebecca J. Passonneau, and David L. Waltz. “SNARE: Social Network Analysis and Reasoning Environment”. Proceedings of AAAI 2012 Spring Symposium in AI, The Fundamental Social Aggregation Challenge, and the Autonomy of Hybrid Agent Groups, pp 42-48, March 2012, Stanford, CA.

[W20] Shanjun Cheng, **Anita Raja** and Victor Lesser. "Multiagent Meta-level Control for Predicting Meteorological Phenomena", Proceedings of AAAI 2010 Workshop on Metacognition in robust social systems, pp 6-13, Atlanta, GA. July 2010.

[W19] Mary M. Brown, Robert Flowe and **Anita Raja**, " Acquisition Risks in a World of Joint Capabilities" In Naval Postgraduate Schools 7th Annual Acquisition Research Symposium, May 12-13, 2010 Monterey, CA.

[W18] Shanjun Cheng, **Anita Raja**, Linda Xie, Ivan Howitt "A Distributed Constraint Optimization Algorithm for Dynamic Load Balancing in WLANs". In Proceedings of Eleventh International Workshop on Distributed Constraint Reasoning to be held in conjunction with IJCAI 2009, pp 31-45, Pasadena CA.

[W17] Ashok Goel, Emile Morse, **Anita Raja**, Jean Scholtz, John Stasko "Computational Explanations for Report Generation in Intelligence Analysis". Proceedings of IJCAI 2009 Workshop on Explantion-aware Computing (ExaCt 2009), pp 37-47, Pasadena CA.

[W16] Jia Yue, **Anita Raja**, Dingxiang Liu, Xiaoyu Wang, William Ribarsky "A Blackboard-based Approach towards Predictive Analytics", Proceedings of AAAI Spring Symposium on Technosocial Predictive Analytics, pp 154-161, Stanford University, CA, March 23-25, 2009.

[W15] Anita Raja and Victor Lesser. Coordinating Agent’s Meta-level Control, April 2008. Proceedings of AAAI 2008, Workshop on Metareasoning: Thinking about Thinking, pp 106-112, Chicago, IL. July 2008.

[W14] Michael Cox and **Anita Raja**, "Metareasoning: A Manifesto", Proceedings of AAAI 2008, Workshop on Metareasoning: Thinking about Thinking, pp 1-4, Chicago, IL. July 2008.

[W13] George Alexander, **Anita Raja**, Ed Durfee and David Musliner, Design Paradigms for Meta-Control in Multi-Agent Systems. Proceedings of *AAMAS 2007 Workshop on Metareasoning in Agent-based Systems*, pp 92-103, Hawaii, May 2007.

[W12] Anita Raja and Ashok Goel, Introspective Self-Explanation in Analytical Agents. Proceedings of *AAMAS 2007 Workshop on Metareasoning in Agent-based Systems*, pp 76-91, Hawaii, May 2007.

[W11] Jiang Xie, Ivan Howitt, and **Anita Raja**, "Cognitive Radio Resource Management Using Multi-Agent Systems," Proceedings of First IEEE Workshop on Cognitive Radio Networks (CRN 2007), in conjunction with IEEE Consumer Communications and Networking Conference (CCNC 2007), 2007.

[W10] William J. Tolone, David Wilson, **Anita Raja**, Wei-ning Xiang, Huili Hao, Stuart Phelps, E. Wray Johnson "Critical Infrastructure Integration Modeling and Simulation" *Proceedings of 2nd Symposium in Intelligence and Security Informatics* Tucson, Arizona, June 2004.

[W9] Anita Raja and Victor Lesser. "Reasoning about Coordination Costs in Resource-Bounded Multi-Agent Systems." *In Proceedings of AAAI 2004 Spring Symposium on Bridging the multiagent and multirobotic research gap*, Stanford, CA, March 2004.

[W8] Anita Raja and Victor Lesser "Automated Meta-Level Control Reasoning in Complex Agents" Proceedings of Eighteenth International Conference on Artificial Intelligence (IJCAI 2003), Workshop on 'Agents and Automated Reasoning", Acapulco Mexico.

[W7] Anita Raja and Victor Lesser. "Meta-level Control in Multi-Agent Systems", *Proceedings of AAAI/KDD/UAI-2002 Joint Workshop on Real-Time Decision Support and Diagnosis Systems*, Edmonton, Alberta, Canada, July 2002.

[W6] Anita Raja and Victor Lesser. "Real-Time Meta-Level Control in Multi Agent Systems", *Proceedings of Multi-Agent Systems and Applications - ACAI 2001 and EASSS 2001 Student Sessions*. Prague, Czech Republic, July 2001.

[W5] Anita Raja, Thomas Wagner, and Victor Lesser. Reasoning about Uncertainty in Design-to-Criteria Scheduling. *Proceedings of AAAI 2000 Spring Symposium on Real-Time Autonomous Systems*, AAAI, pp. 76-83. 2000**.**

[W4] Victor Lesser, Bryan Horling, Frank Klassner, **Anita Raja**, Thomas Wagner, Shelley XQ. Zhang. "Recent Extensions to BIG: A Resource-Bounded Information Gathering System", *Proceedings of American Association for Artificial Intelligence Workshop on Intelligent Information Systems*, Orlando, FL. July 1999.

[W3] Victor Lesser, Michael Atighetchi, Brett Benyo, Bryan Horling, **Anita Raja**, Regis Vincent, Thomas Wagner, Ping Xuan, and Shelley XQ-Zhang. "The Intelligent Home Testbed", *Proceedings of Third International Conference on Autonomous Agents, Workshop on Autonomy Control Software*, Seattle, WA, June 1999.

[W2] Victor Lesser, Bryan Horling, Frank Klassner, **Anita Raja**, Thomas Wagner, Shelley XQ. Zhang. "A Resource-Bounded Interpretation-Centric Approach to Information Gathering", *Research Overview, Proceedings of AAAI-98 Workshop on Information Integration*. Madison, WI, July 1998.

[W1] Joe Felder and **Anita Raja**. "Companion System to Web Browsing", *ACM 1996 Poster Presentation*, Philadelphia, PA.

Archived Publications:

[A1] Rafael F.Guerrero, Raiyan R. Khan, Ronald J.Wapner, Matthew W. Hahn, Anita Raja, Ansaf Salleb-Aouissi, William A. Grobman, Hyagriv Simhan, Robert Silver, Judith H. Chung, Uma M. Reddy, Predrag Radivojac, Itsik Pe'er, David M. Haas. , "Genetic Polymorphisms Associated with Adverse Pregnancy Outcomes in Nulliparas", medRxiv, 2023.05. 25.23290500

[A2] Anton Goretsky*, Anastasia Dmitrienko, Irene Tang, Nicolae Lari, Owen Kunhardt*, Raiyan Rashid Khan, Cassandra Marcussen, Adam Catto, Daniel Mallia, Alisa Leshchenko*, Adam (Yun Chao) Lin, **Anita Raja**, Ansaf Salleb-Aouissi, Itsik Pe'er, Ronald Wapner, Cynthia Gyamfi-Bannerman, " Data Preparation of the nuMoM2b Dataset" medRxiv 2021.08.24.21262142; doi: https://doi.org/10.1101/2021.08.24.21262142

[A3] Adam (Yun Chao) Lin, Daniel Mallia, Andrea Clark-Sevilla, Adam Catto, Alisa Leshchenko, David M. Haas, Ronald Wapner, Itsik Pe'er, Anita Raja, Ansaf Salleb-Aouissi, "Preeclampsia Predictor with Machine Learning: A Comprehensive and Bias-Free Machine Learning Pipeline", medRxiv 2022.06.08.22276107; doi: https://doi.org/10.1101/2022.06.08.22276107

7. Teaching

A. Major Accomplishments

- **Designed and Taught Large Lecture Course** on Data Structures and Algorithms in Spring 2020 and Fall 2022, 170 Computer Science undergraduates.
- **Designed and Taught new Interdisciplinary Course** on Distributed AI and Blockchain in Spring 2018, 15 students from all four engineering departments completed the course.
- **Project Director for Two MOOCs on the edX Platform:** Directed the creation and delivery of Cooper Union's first set of MOOCS as part of edX's High School Initiative. The 16 week AP Chemistry and Computer Science courses include 7-10 minute lecture segments interleaved with problem solving, multiple choice practice questions and exams. The courses went live on May 13, 2015 and were completed in September 2015. We have over 7000 students enrolled in each course and about a 1000 students participating on a weekly basis.
- **The Partially Flipped Class Room**: I have taught Network-based application development (ITIS 4166/5166) an undergraduate/graduate combined course almost every semester since 2003. This course has evolved from a concept course in 2003 with an enrollment of 25 students to a heavily programming oriented course with an enrollment of 80-90 students across two sections with a heavy undergraduate involvement. The assignment definitions were structured to help students develop their critical thinking, problem solving and application design skills in addition to improving their ability to develop software for a large application. I have introduced more hands-on interactive sections during the lecture. The TA goes over the implementation of the techniques I lectured about every other class meeting; I also had students with the best homework solutions present their solution in class. Finally, students with prior experience on topics relevant but not covered in class such as JQuery were encouraged to present on the topics in class. There were several extra credit options to challenge the students who are doing well in the class while not penalizing those who are still struggling with basic java and object oriented skills. The students were given several helpful hints to make progress in their assignments. This is a potentially transformative effort to find the balance between a course that requires significant in-class lecture time as well as lab time.
- **PI and Director of CCI's DOE-funded 2013-2016 GAANN Fellowship program (Fall 2013 – July 2014 when I left UNCC)** to increase number of qualified researchers and teachers in computing. Lead efforts to recruit, develop, graduate, and place six students with superior academic abilities into the UNC Charlotte PhD in Computing and Information Systems (CIS) program and ultimately into academic careers, Fall 2013 onwards. The fellowship website is gaann.uncc.edu. We have had tremendous interest in the program and have already admitted the first fellow to the program in Spring 2014.
- **8 hour Start-up:** In Fall 2010, I organized the second installment of the 8-hour start-up, a web-based application design and programming competition for undergraduate and graduate students this Fall with a focus on a mash-up application that leverages existing API (http://www.sis.uncc.edu/~anraja/8Hr09). Over 15 students at the graduate-level and undergraduate-level participated. Three other faculty from the department as well judges from industry helped make this a successful event. The competition was well received by the students and they appreciated the lessons on teamwork and feedback from both faculty and industry affiliate judges.
- **Principal PI and Organizer of AAMAS 2013 First CRA-W/CDC Discipline-specific Mentoring Workshop.** This was a week-long workshop to expose 12 undergraduate students under-represented groups in computing to cutting edge research in agents and multiagent systems; attend technical talks by current doctoral students that would motivate other participants to think and get excited about research; talk about career paths in multiagent systems and the skills the students should acquire to be successful researchers. This workshop was rated as very beneficial by the attendees.
- **Undergraduate and Graduate Mentoring**: Supervised over 30 undergraduates including five senior projects and two NSF-funded REU students. Received the CCI 2006 Essam El-Kwae Student-Faculty research award that recognizes productive undergraduate mentoring efforts and joint publications. Supervised multiple masters and Ph.D.-level student). One undergraduate advisee, George Alexander

was the 2006 TIAA-CREF fellowship recipient and another is the first author of a best paper award mentioned above. One of my graduate students, Mohammad Hasan, won the Chair's prize at the 2013 CCI Ph.D. student Poster competition.

- Member of UNCC's CCI Center for Education Innovation (http://cei.uncc.edu/)

B. Courses Taught

- Hunter College CUNY CSCI 353/750 Machine Learning, Fall 2020; CSCI 795 Fall 2021, Spring 2023
    - This course covers the theory, algorithms, and applications of machine learning. Students will study what is involved in learning models from data and how to evaluate these models.
- Hunter College CUNY CSCI 335 Software Design and Analysis III, Spring 2020, Fall 2022
    - The design and analysis of various types of algorithms, including searching, sorting, graph and tree algorithms. Problem-solving techniques, Worst and average case behavior analysis and optimality., Polynomial time complexity classes and theory, including NP-completeness. Specifically it deepens and enhances C++ programming skills while covering Algorithm Analysis, Advanced Trees, Special Priority Queues, Sorting Algorithms, Disjoint Sets, Graph Algorithms, Dynamic Programming, Randomized Algorithms, and Amortized Analysis.
- Hunter College CUNY CSCI 350/761: Artificial Intelligence, Spring 2020, Spring 2022
    - A survey of artificial intelligence including intelligent agents, search and control, knowledge representation, Constrain satisfaction, reasoning under uncertainty, decision making, learning, , and distributed AI, AI Applications, AI and Ethics. Undergrad/Grad cross-listed course.
- Cooper Union PH360 Distributed Networks, Multiagent Systems and Blockchain Applications Spring 2018 (will be offered as EID 377 in future semesters):
    - This course will focus on the study and application of multiagent theories and techniques in designing next generation blockchain applications. This will include the role of coordination and promoting cooperative behaviors in large-scale distributed networks and the internet economy. Topics will include algorithms for agent interaction in cooperative and competitive environments, consensus formation and negotiation in distributed systems, smart contracts, public vs private blockchains, cryptographic hash functions digital signatures. These techniques will be used to implement a blockchain application where a trusted environment for all transactions is essential. Applications could include health data exchange, construction projects, derivatives processing, food safety supply, food safety supply chain, advertising, energy and governance.
- Cooper Union EID 101: Engineering Design and Problem Solving Fall 2016, Fall 2017, Fall 2018
    - Students work in multidisciplinary teams to design, fabricate and build low-cost devices for diabetes management. The prototypes must be very robust and usable in rugged terrains that are typical in Uganda. They should be easily repairable and use locally available material as much as possible. The designs should be simple, precise and well-documented so that hospitals and medical professionals can replicate it locally in a self-taught fashion. Students learn the fundamentals of engineering design and analysis while using tools from the machine shop, finite element analysis and stress analysis tools, and smart sensors as part of the process.
- Cooper Union PH235: Physics Simulations Fall 2015, Spring 2017, Spring 2019
    - Students are taught how to numerically solve ordinary differential equations using 4th order techniques such as Runge-Kutta and Adams-Bashforth-Moulton in the Python programming language. These techniques will be used to solve diverse physics problems not amenable to simple analytical solution. Emphasis is placed on physically accurate modeling (e.g. satisfying conservation laws to high accuracy) and the effective use of computer graphics/animation for the presentation of results.
- UNCC ITIS 5166 Network Based Application Development, Spring 2004, Fall 2004, Fall 2006, Fall 2007, Spring 2008, Fall 2008, Spring 2009, Fall 2009, Spring 2010, Fall 2012, Spring 2013.
    - Graduate Course includes lab components and interactive elements. Building network-based applications requires expertise in a variety of areas ranging from user friendliness to high performance computations to information and data security. Topics included http and https protocols; design principles for network-based applications; design and development of Java

Servlets, JSP, MVC architecture, Web services and .NET; AJAX, JQuery, Mootools; Frameworks and Design Patterns; and Principles of information security in network-based applications.

- Columbia University COMS E6901 Independent Study Course: Situational Awareness in the Social Media Space (Co-advisor, Columbia University) - Fall 2011
    - The goal of this seminar is to develop methodologies and algorithms that help detect/gain real-time situational awareness of critical information in a social media space (SMS). It explores how will we know what we NEED to know even though we did not know we needed to know it; and how will we know that something "pertinent" is being said in a SMS. Students gain experience in building a distributed agent system that will have the ability to reason, understand and learn patterns of information/communication; this is done over time, space, cultures and other contextual qualifiers that are distributed across reasonably "large" SMS that represent an important event/proposition/influence.
- UNCC ITIS 4166 Network Based Application Development, Fall 2006, Fall 2007, Spring 2008, Fall 2008, Spring 2009, Fall 2009, Spring 2010.
    - Undergraduate Course cross-listed with graduate level course, developed undergraduate requirements making it core course in Web Application track.
- UNCC ITIS 6010/8010 Software agent systems, Spring 2005, Spring 2007, Spring 2009.
    - Graduate Course, This course focuses on the theories and techniques involved in building these next generation collaborative distributed systems. Topics discussed will include agent interaction in cooperative and competitive environments, agent architectures, visual analytics, team and coalition formation, game theoretical models, market mechanisms, multi-agent/robot learning, mixed-initiative computing including Asimovian adaptive agents, and agent-based service oriented computing. The students will gain hands-on experience by building agents that will compete with each other as part of a semester-long project in addition to shorter assignments.
- UNCC ITIS 2300 Web Based Application Development, Spring 2006.
    - Undergraduate Course, designed to present participants with an overview of basic concepts for developing applications that are implemented via the World Wide Web. Topics include HTML, client-side scripting, server-side programming, objects associated with browsers, and basic Web design.
- UNCC ITIS/ITCS 6148/8148 Advanced Object Oriented Design and Implementation, Fall 2003, Fall 2005.
    - Graduate Course, developed new course. Overview of advanced topics on issues related to the design, implementation, integration and management of large object-oriented systems. Participants will become familiar with techniques that are gaining attention in the industrial and research communities. Topics include: object models and object modeling, oo frameworks, persistent and distributed objects, design patterns, aspect oriented programming, agent-oriented software engineering, and semantic web.
- UNCC ITIS 3650, 3651 Undergraduate Senior Project Fall 2005, Spring 2006, Spring 2007, Summer 2007, Fall 2007, Spring 2008, Fall 2012.
- UMASS CMPSCI 197J Advanced UNIX Environment, Winter 1999
    - Undergraduate Course, Lecturer.

8. RESEARCH GROUP

Advisees (Hunter College):
Graduate Students

1. Arezoo Bybordi, CUNY Grad Center PhD Student, 2021-Present.
2. Nan Jia, CUNY Grad Center PhD Student, 2022-Present.
3. Mahdi Loodaricheh, CUNY Grad Center PhD Student, 2023-Present.

Undergraduate Students

1. Allen Chien, NIH Bridges REU student, 2023-Present

2. Jangho Lee, CS Undergrad, 2023-Present
3. Eric Li, CS Undergrad, 2022-Present
4. Alisa Leschenko, CS Undergrad, 2021 -Present

Alumni:
Graduate Research Assistants at CUNY Hunter College
1. Daniel Mallia, Hunter CS Masters, 2021-Present
2. Adam Catto, CUNY Grad Center DataScience Masters, 2020- 2022

Undergraduate Research Assistants at CUNY Hunter College
1. Matthew Dicicco, CS Undergrad, 2021-2022.
2. Anton Goretsky, CS Undergrad, Hunter College, 2020-2021, Ph.D. Student, Dept of Computer Science, University of Maryland
3. Nigel Ferrer, CS Undergrad, 2020- 2021
4. Owen Kunhardt, CS Undergrad, 2020, Software Engineer, Google
5. Marin Marinov, CS Undergrad, 2020- 2021, Software Developer, Vanguard
6. Yaroslava Shynkar, CS Undergrad, 2020- 2021,
7. Rhia Singh, CS Undergrad, 2020
8. Ajani Stewart, CS Undergrad, 2020, MIT BCS Research Scholar
9. Daniel Rozenzaft, M.S. in Applied Math, Columbia University

Undergraduate Students at Cooper Union
1. Di Mei, EE Undergrad, 2018-2020, M.S Program, Northwestern University, RIOS Lab of Tsinghua-Berkeley Shenzhen Institute.
2. Joseph Huang, EE Undergrad, 2018-2020
3. Arber Duka, EE Grad, 2017
4. Brendan Fernes, EE Undergrad, 2015- 2016
5. Eli Friedman, EE Undergrad, 2015 – 2016, Algorithm Engineer, Datagen
6. Ihsan Gunay, EE Undergrad, 2016 - 2017
7. George Ho, BSE Undergrad, 2017
8. Andy Jeong, EE Undergrad, 2019, M.S Program, KAIST
9. Vishnu Kaimal, EE undergrad, 2016-2017
10. Do Hyung Kwon, EE Undergrad, 2019
11. Jing Jiang, EE Undergrad, 2018-2019
12. Yilun Jiang, EE Undergrad, 2018-2019, Maxim integrated Inc., Colorado Springs
13. Alex Rybchuk, ME Undergrad, 2015-2016
14. Eui Seong Han, EE Undergrad, 2015
15. Padraic McAtee, ME Undergrad, 2017-2018
16. Sahil Patel, EE Undergrad, 2016-2017
17. Kevin Sheng, EE Undergrad, 2016-2017
18. Arvinth Sethuraman, Undergrad, 2017-2018, MD Program, New Jersey Medical School
19. Brenda So, EE Undergrad, 2016
20. Min Joon So, ME Undergrad, 2018-2019
21. Tanay Trivedi, BSE Undergrad, 2017-2018
22. Hetian Wu, EE Grad, 2016- 2017, Software Engineer, Facebook
23. Kevin Yao, ME Undergrad, 2016-2017

High School Students Supervised
- Ayan Kohli, Hunter College High School, Summer 2022, 2023
- Thaalank Ranjan, Bergen County Technical High School Intern, 2016-2017, B.S. Cornell University.
- Solbi Oh, Schreiber High School, 2016-2017
- Alexandra Gao, Schreiber High School, 2016- 2017
- Xinyu Lin, Bronx High School of Science, 2016-2017

UNCC:

- Rashedul Hasan, Ph.D. (Fall 2011- Summer 2014), Assistant Professor of Practice, Department of Computer Science, University of Lincoln, Nebraska
- Jagan Mohan Rao Vujjini, M.S. (Fall 2013-Spring 2014), IBM Watson, Raleigh , NC.
- Shalini Rajanna, (M.S. Computer Science, 12/2013), Developer for Big Data Platform, Bank of America.
- Daniel Ball, NSF REU advisee, (Fall 2012 – Fall 2013)
- Coreen Burke, (NSF REU advisee, Fall 2012 – Spring 2013)
- Peter Malmgrem, (Undergraduate Research Assistant, (Fall 2012 - Spring 2013)
- Terry Rabinowitz, (Undergraduate, Fall 2012 – Spring 2013)
- Shanjun Cheng, (Ph.D. 2007-2012), Senior Research Engineer, WeWork NYC.
- George Alexander, (B.S., Ph.D. Program, 2005-2009; 2011- 2012), Software Engineer at *Wells Fargo* Financial.
- Jia Yue, (M.S., 2010), Software Engineer at *Wells Fargo* Financial.
- Jayasri Vaidyanath (M.S. 2007) Senior IT Business Analyst, Lifecycle Safety at Quintile
- Dingxiang Liu, (Ph.D. Program, 2006-2008).
- Paul Abernathy (M.S., 2006), Software Engineer at Bank of America
- Phani Burra (M.S., 2007).
- Verghese Mapillai (M.S., 2005). Software Engineer at Dell.
- Niraj Mehta (M.S., 2006) Senior Developer Capital Market at TIAA-CREF.
- Kaushal Shah (M.S., 2004), Manager, Risk Advisory Services, Ernst & Young.
- Jason Hillgen (Undergraduate, 2007-2008)
- Brian Rozier (Undergraduate, 2007-2008)

Doctoral Theses Supervised

1. CUNY Grad Center: Ph.D. Defense Committee Member, December 1, 2023, Tatiana Castro Velez, Topic: "A Survey on Analyses and Transformations on Deep Learning Systems", Chair: Raffi Khatchadourian..
2. CUNY Grad Center: Ph.D. Defense Committee Member, August 18, 2023, Yunhua Zhao, Topic: "A Systematic Survey of Just-In-Time Software Defect Prediction", Chair: Hui Chen.
3. CUNY Grad Center: Ph.D. Defense Committee Member, April 21, 2021, Yiming Tang, Topic: "Towards Automated Software Evolution of Data-intensive Applications", Chair: Raffi Khatchadourian.
4. Columbia University: Ph.D. Defense Committee Member, June 29, 2016, Faiza Khattak, Topic: "Toward a Robust and Universal Crowd Labeling Framework", Chair: Dr. Ansaf Salleb-Aouissi.
5. UNCC: Ph.D. Defense Chair, June 26, 2014, Mohammad Rashedul Hasan, Title: Topology-aware Approach to Emergence of Social Norms in Multiagent Systems" Ph.D. Proposal Defense Committee Chair, November 5, 2013, Title: "*Towards a Generalized Theory of Communication Convention in Multiagent Systems*"; Ph.D. Qualifying Exam Chair, April 2013, Mohammad Hasan, Areas of Concentration: Multiagent Systems, Network Science, Application Security. (Graduation date August 2014)
    - Won Department of Software and Information Systems Chair's Best Poster Award in SIS 2013 Ph.D. Poster Competition for poster on Coalition in Complex Networks.
6. UNCC: Ph.D. Defense Chair, August 15, 2012, Ph.D. Proposal Defense Committee Chair, June 14, 2011, and Ph.D. Qualifying Exam Chair, December 2009, Shanjun Cheng, Topic: "Coordinating Meta-level Control Across Agent Boundaries".
    - Sr. Research Engineer, Tumblr, NYC.
    - First author of publication that won IEEE IAT 2010, Best paper award.
7. UNCC: Ph.D. Proposal Defense Committee Member, November 12, 2014, Saeed Al-Haj, Topic: "Using Formal Methods Towards Improving Cloud IAAS Environments".

8. UNCC: Ph.D. Proposal Defense Committee Member, December 2013 and Ph.D. Defense Committee Member, April 6, 2015, Mohammad Ashiqur Rahman, Topic: "Automated Formal Analytics for Smart Grid Security and Resiliency".
9. UNCC: Ph.D. Qualifying Exam Committee Member, May 2012, Osarieme Omokaro, Area of Concentration: Networks.
10. UNCC: Ph.D. Proposal Defense Committee Member, December 2, 2011 and Ph.D. Defense Committee Member, February 18, 2015, Nadia Najjar, College of Computing and Information Systems, Topic: "Group Modeling, Recommendation and Evaluation in Collaborative Filtering Group-based Recommender Systems".
11. UNCC: Ph.D. Qualifying Exam Chair, December 2008, George Alexander, Area of Concentration: Artificial Intelligence.
    - 2006 TIAA-CREF fellowship recipient.

12. UNCC: Ph.D. Proposal Committee Member, December 2007 and Ph.D. Defense Committee Number, September 2008, Gautam Singaraju, College of Computing, "Toward Sender Accountability on Email Infrastructure Using Sender Identity and *Reputation Management*".

Masters Students Supervised

1. Hunter College: M.S. Thesis Defense Committee Chair, Daniel Mallia, Dec 2022, Department of Computer Science, "Towards an Unsupervised Bayesian Network Pipeline for Explainable Prediction, Decision Making and Discovery".

2. Hunter College: M.S. Thesis Defense Committee Member, Manal Zneit, May 2022, Department of Computer Science, "A Tool Supported Metamodel for program BugFix Analysis in Empirical Software Engineering" Chair : Raffi Khatchadourian

3. UNCC: M.S. Thesis Defense Committee Chair, Shalini Rajanna, November 2013, Department of Software and Information Systems, "*Text and Image Analysis of Defense Report*s".

4. UNCC: M.S. Thesis Defense Committee Chair, Jia Yue, November 2009, Department of Software and Information Systems, "*Controlling resource-bounded reasoning for visual analytics in a blackboard-based agent*".

5. UNCC: M.S. Thesis Defense Committee Member, Keonsu Kim, Department of Electrical and Computer Engineering, June 2008, "*Wireless LAN Traffic prediction based on the Support Vector Machine*".

6. UNCC: M.S. Thesis Defense Committee Member, April 2008, Jason Whaley, Department of Software and Information Systems, "*Improving Recommendation Quality in Large-Scale Online Systems*".

7. UNCC: M.S. Independent Study Project Supervisor, August 2006, Niraj Mehta, Department of Software and Information Systems, *"Managing Uncertainty Propagation Using a Numerical Approach".*

8. UNCC: M.S. Thesis Defense Committee Member, December 2005, Vikram Sharma, Department of Software and Information Systems, *"Centralized Registry Framework for Windows Based Information Infrastructure System Management and Configuration Diagnostics*

Bachelors Students Supervised

1. UNCC: Primary Advisor for NSF-funded Research Experience for Undergraduates, Fall 2012-Spring 2013, Daniel Ball, Ontological Structures for Qualitative Decision Theory and Topic modeling".
2. UNCC: Primary Advisor for NSF-funded Research Experience for Undergraduates, Fall 2012-Spring 2013, Coreen Burke, "Ontological Structures for Qualitative Decision Theory and Topic modeling".

3. UNCC: Primary Advisor for Undergraduate Research, Fall 2012-Spring 2013, Terry Rabinowitz, "Value-aware agents for Ethical Decision Making in E-government" with emphasis on Negotiation and Decision Theory.
4. UNCC: Primary Advisor for Undergraduate Research, Fall 2012-Spring 2013, Peter Malmgrem, "Value-aware agents for Ethical Decision Making in E-government" with emphasis on Negotiation and Decision Theory.
5. UNCC: Primary Advisor for Undergraduate Senior Project, Fall 2012, Deanna Jarrett, Department of Computer Science, "Modeling Non-Linear Cascading Consequences in Interdependent Networks".
6. UNCC: Primary Advisor for Undergraduate Senior Project, Fall 2007-Spring 2008, Jason Hillgen, Department of Computer Science, "*Empirical Study of a Multi-Agent System that Tracks Meteorological Phenomenon*".
7. UNCC: Primary Advisor for Undergraduate Senior Project, Fall 2007-Spring 2008, James Rozier, Department of Computer Science, "*Role of Constraint Optimization Algorithms in Wireless Network Resource Management".*
8. UNCC: Primary Advisor for Undergraduate Senior Project, Summer 2007-Fall 2007, George Nwador, Department of Software and Information Systems, *"A Web-based Application for Research Project and Publication Display and Management".*
9. UNCC: Primary Advisor for Undergraduate Senior Project, Fall 2005- Spring 2006, George Alexander, Department of Computer Science, "*Role of Problem Classification in Online Meta-Cognition".*

10. Service and Outreach

A. Selected Professional Activities

Editorship and Organizing Committee:

- IIS Committee Member, NSF 2023 Committee of Visitors.
- Executive Council Member, AAAI, 2022-2025.
- Chair, workshop on "How to Engage in AI Research as an Undergraduate?" at TAPIA 2021, 2022.
- CUNY Faculty ambassador on the National Council for Responsible AI in Fintech.
- Member of AAAI (Association for the Advancement of Artificial Intelligence) Diversity and Inclusion Committee 2020-Present. (https://aaai.org/Organization/diversity-inclusion.php).
- Organizing Committee Member, AAAI-UC-2022, AAAI-Undergraduate Consortium (AAAI-UC) 2021, Mentor for undergraduate students (2020, 2022).
- Co-organizer/Co-chair of AAAI-2020 Undergraduate Outreach Workshop on AI and Robotics: AI-powered Robotics; AMNH announcement.
- Member of Editorial Review Board of Journal of Computer Information Systems, 2012-Present.
- Member of Editorial Board of Journal of Experimental and Theoretical Artificial Intelligence, August 2013-2016.
- Organizing Committee Member, IEEE/WIC/ACM 2015 IAT Technical Committee Program Committee Co-Chair, December 6-15, 2015.
- Invited mentor at inaugural AAAI 15 "Breakfast With Champions" women's mentoring breakfast, Jan 28, 2015, Austin, Texas.
- Organizing Committee Member, Advances in Cognitive Systems 2013 Workshop on Metacognition about Artificial Situated Agents, December 14, 2013, Baltimore, Maryland.
- Co-Organizer of the First CRA-W/CDC Discipline-Specific Mentoring Program on Autonomous Agents and MultiAgent Systems, May 6-10, 2013, St Paul, Minnesota.
- Organizing Committee Member, Scholarship Co-Chair for Twelfth International Conference on Autonomous Agents and Multiagent Systems (AAMAS), St. Paul, Minnesota, May 6-10, 2013.

- Organizing Committee Member, Advances in Cognitive Systems 2013 Workshop on Metacognition about Artificial Situated Agents.
- Co-chair, AAAI -10 Workshop on Metacognition for robust social systems. Co-located with AAAI 2010, July 11, 2010, Atlanta, Georgia.
- Co-Chair, SASO Workshop on Metareasoning in Self-Adaptive Systems. September 2009, San Francisco, USA.
- Co-Chair, AAAI Workshop on Metareasoning: Thinking about Thinking, July 2008, Chicago, USA.
- Co-Chair, First International Workshop on Meta Reasoning in Agent-Based Systems (MRABS 2007), Co-located with AAMAS 2007, May 14, 2007, Hawaii, USA.
- Program Co–Chair, FLAIRS-2006, Special Track on Artificial Intelligence Education.

Senior Program Committee:

- Thirty-second AAAI Conference on Artificial Intelligence, 2018, New Orleans.
- Twenty-second International Joint Conference on Artificial Intelligence, 2011, Barcelona, Spain.

Program Committee:

- 26th International Symposium on Methodologies for Intelligent Systems, ISMIS-22, Cosenza, Italy.
- 12th International Conference on Agents in Traffic and Transportation (ATT 22), Vienna, Austria.
- AAAI-21 Special Programs and Tracks - Thirty-Fifth AAAI Conference on Artificial Intelligence.
- Autonomous Agent and Multi-Agents Systems - AAMAS (2004, 2005, 2007, 2008, 2009, 2010, 2011, 2012, 2015, 2016, 2017, 2020, 2022, 2023,2024).
- AAMAS Workshop on Multi-Agent Sequential Decision Making in Uncertain Domains (2007, 2008, 2009, 2012, 2013, 2014, 2015).
- Association for the Advancement of Artificial Intelligence - AAAI (2006, 2007, 2008, 2016).
- Advances in Cognitive Systems, 2015
- Fourth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (2010).
- Florida Artificial Intelligence Research Society - FLAIRS (2008).
- Florida Artificial Intelligence Research Society Special Track on Artificial Intelligence Education (2004, 2005, 2006, 2007, 2008, 2009, 2010).
- AAMAS Workshop on Safety and Security in Multiagent Systems - SASEMAS (2004, 2005, 2006).
- AAAI Spring Symposium on Techno-social Predictive Analytics (March 2009).
- Fifth International Symposium High-capacity Optical Networks & Enabling Technologies (2008).
- Workshop on New Forms of Reasoning for the Semantic Web: Scalable, Tolerant and Dynamic (NeFOR08).
- ECAI Workshop on New Trends in Real-Time Artificial Intelligence - NTeRTAIn (2006).
- Pacific Rim International workshop on Multi-Agent systems - PRIMA (2004, 2005), International Workshop on Agent-based Computing for Enterprise Collaboration - ACEC-WETICE (2004, 2005, 2006), International Workshops on Enabling Technologies Infrastructure for Collaborative Enterprises - WETICE (2002, 2003).

Grant Proposal Review:

- NSF Panel Member (Intelligent Information Systems (IIS): 2004, 2008, 2009, 2010 (CISE), 2011, 2012, 2014, 2015, 2016, 2018, 2019, 2020, 2022, 2023 (CISE, NSF COV)
- NSF External Reviewer (2007, 2013).
- Science Foundation Ireland (Onsite Review Panel Member, 2022)
- Israel Science Foundation (2011).
- Dutch National Science Foundation (NWO), 2004.

Reviewer:

- Reviewer and Mentor for AAAI-2020, AAAI-2021 Undergraduate Consortium research posters.
- Reviewer PSC-CUNY grants (2022)

- ACM Transactions on Autonomous and Adaptive Systems (*TAAS*), 2021.
- Signal, Image and Video Processing Journal (2016).
- Journal of Autonomous Agents and MultiAgent Systems (2007, 2008, 2009, 2011, 2013, 2020, 2021).
- Journal of Machine Learning Research (2006, 2012, 2013).
- 2013 SIAM International Conference on DataMining.
- Artificial Intelligence (AIJ), 2010.
- PSEG Institute for Sustainability Studies (2012).
- 33rd Annual German Conference on Artificial Intelligence (KI), Karlsruhe, Germany, September 21-24, 2010.
- International Transactions in Operational Research (2010) Artificial Intelligence Journal (2009, 2010), Computational Intelligence (2008).
- Special issue of Multiagent and Grid Systems on "Coordinating Agents' Plans and Schedules (2008).
- International Journal of Cooperative Information Systems (2007).
- IEEE Transactions on Automation Science and Engineering (2007).
- IEEE Transactions on Systems, Man and Cybernetics (2001, 2002, 2006, 2007).
- Journal of Systems and Software (2004).
- International Journal of Computers and Applications (2004).
- Fifth International Conference on Knowledge Based Computer Systems (2004).
- European Conference on Artificial Intelligence (2002).
- Autonomous Agents Workshop on Infrastructure for Agents, MAS, and Large Scale MAS (2001).

University/Inter-Departmental Activities:

CUNY/Hunter College/Grad Center

- Member of Hunter College Presidential Task Force on Writing and Presentation Skills (July 2023 – Present)
- Member of Hunter College Department of Computer Science Masters Program Committee (Fall 2021- Present)
- Member of Hunter College Promotions and Budget Committee (Spring 2022-Present).
- Member of Hunter College Faculty Senate (2019- 2021).
- Member of Graduate Center Curriculum and Examinations Committee (July 2022- June 2024)
- Member of Graduate Center Faculty Membership Committee (July 2022-June 2024)
- CUNY Faculty Ambassador **i**n National Council in Artificial Intelligence (Fall 2020-Spring 2022).

Cooper Union and UNCC

Administrative Accomplishments

- **Cooper Union School of Engineering Associate Dean Duties:** Established research and education exchange with Icahn School of Medicine, 2018, Co-led Deans office efforts for ABET Accreditation Visit, 2018, Co-authored winning proposal for a cross-disciplinary initiative to design a leading-edge program in Computation/Computer Science, Chaired the Masters program and Summer Abroad program.
- **UNCC Software and Information Systems Ph.D. track Chair (2004-2006):** Chairing the newly established UNCC SIS Track PhD Committee gave me the opportunity to participate in setting up the process of actively recruiting, retaining and graduating high quality Ph.D. students.
- **CCI Honors Committee Chair (2008-2010)**: I chaired the UNCC College of Computing and Infromatics (CCI) Honors Committee. I lead efforts in establishing the CCI Honors program, developed criteria and procedures for admission, evaluation and retention as well identifying the types of courses that will qualify to be included the Honors curriculum. First set of students were

admitted in Fall 2008. http://cci.uncc.edu/academic-programs/bachelors/honors-program.

- **SIS Curriculum development (2009-2010):** I was a member of the UNCC CCI Ad-hoc committee for undergraduate curriculum revitalization and actively participated in several efforts to improve the curriculum of the College. This included restructuring the curriculum to include critical thinking and ethics as mandatory topics of study as well establishing the CCI Honors Program.
- **SIS Academic Planning Committee (2009-2010):** Chaired the Ad-hoc committee to determine the 5-year strategic plan for the Department. Worked with the Department Chair and faculty from various areas to bring consensus to research focus and resource allocation. Led discussions on this topic at the annual faculty retreat.

Service Activities

- Represented Cooper Union in NYC Women in tech event, Columbia University, Spring 2019.
- Member of Institutional Review Board (2018-2019)
- Co-authored Art, Architecture, Construction and Engineering (AACE) Lab major grant proposal, 2017. Lab is being established.
- Panelist at Biomedical Engineering Society's "What is Biomedical Engineering?" Panel, March 2017
- Breakout group panel host for Cooper Union Women In Engineering annual event, (2015-Present).
- Invited Speaker to Biomedical Engineering Society on "Preparing for the Medical School Application Process", December 2016
- Co-leading Deans office efforts for ABET Accreditation Visit in November 2018.
- Member of Middle States Working Group for Standard VI : Planning, Resources, and Institutional Improvement. (2016-Present)
- Member of President's Cabinet (2017-2019).
- Member of Academic Leadership Committee (2014-2019).
- Member of Public Events Committee (2016-2017).
- Member of Exhibition Committee (2016-2019).
- Member of Diversity Committee Faculty and Staff Working Group (2018).

UNCC

- Member of Faculty Research Grants Committee (2012-2014).
- Alternate Representative to Faculty Council (2009-2010).
- Member of University College (2007-2008).
- Member of Faculty Council (2004-2005).
- Member of Summer Sessions Committee (Alternate) (2004-2006).
- Member of Faculty Advisory Committee (2004-2005).
- Invited faculty speaker at UNCC Association of Computing Machinery - Women (ACM-W) "Women in the Field of Technology" event, April 2013.
- Moderator and Panelist on Robo-Ethics Panel, UNC Charlotte Ethics in Emerging Technologies Symposium (April 2008).
- Co-organizer and Judge, Department of Software and Information Systems' "8-hour start-up Competition" (April 2008).
- UNCC Graduate Research Fair Judge (2005).
- Invited Panel Member at New Faculty Orientation (August 2004).

College Committees:

- Member of College Review Committee (2010-2011).
- Chair of Honors Committee (2008-2010).
- Member of Honors Committee (2007-2008).
- Member of College of Computing and Informatics Philosophy Alliance (2007-2008).
- Member of Undergraduate Committee (2007, 2008, 2009, 2010).
- Member of Ad-hoc Committee for Undergraduate Curriculum (2006-2008).

- Member of Ad Hoc Committee for Recruiting Ph.D. students (2006-2007).
- Member of CCI Executive Committee, Secretary, (2005-2006).
- Member of Graduate Committee (2003-2005).
- Member of PhD Steering Committee (2004-2006).
- Member of Diversity Committee (2004-2005).

Departmental Committees:

- SIS Faculty Search Committee (2013-2014).
- SIS Research Committee (2012-2014).
- Chair of Academic Planning Committee (2009-2010).
- Chair of Ad-hoc Committee to establish core courses for the SIS Ph.D. curriculum (2009-2010).
- Member of Departmental Reappointment, Promotion and Tenure Committee (2009-2010, 2012-2013).
- Member of Undergraduate Committee (2006-2007)
- Member of SIS Lab Space Coordination Committee (2007-2008)
- Member of Graduate Student Support (2004-2006)
- Chair of SIS Track PhD Committee (2004-2006)
- Chair of Graduate Committee (2005-2006)
- Member of Graduate Committee (2003-2005, 2008-2009)
- Member of UNCC Cognitive Science Academy (2005- Present) .
- Graduate Student Representative, Department of Computer Science, University of Massachusetts (Jan 2001- Jan 2002).

10. Professional Presentations

- February 13, 2023, "Responsible AI: Mitigating Uncertainty in Mission-Critical Systems", Invited Speaker, Third International AAAI Workshop on Modelling Uncertainty in the Financial World (MUFin'23), Washington D.C.
- April 21, 2022. "Artificial Intelligence: Current Frontiers and Challenges", Invited Speaker and Panelist, Conference on Technology and Society in the Next Generation: Growth, Security and Well-Being: Technological Directions, Roosevelt House, NYC.Sponsors: Hunter College and UC Berkeley.
- April 12, 2021, "Being a Woman in STEM: Shattering the Glass Ceiling", Invited Speaker, Queens College Women In Science Speaker Series.
- March 8, 2021, March 8, 2022, March 8, 2023 "Distributed Artificial Intelligence Lab", Invited Speaker, CUNY Grad Center Research Survey course.
- May 14, 2020 "Blockchain for Distributed Applications", Invited Speaker, IEEE International Conference on High Performance Switching and Routing.
- February 7, 2020 "How to Thrive and not just survive your path towards a PhD?", Invited Talk, AAAI 2020 Undergraduate Consortium.
- September 20, 2019, "Towards Decision Making in Bounded-Rational Agents", Invited Speaker, Data Science and Computer Science Back-to-School Research Talk, CUNY Grad Center.
- August 3, 2017 "Interdisciplinary Research: a Catalyst for Scientific Advancement and Societal Impact", Invited Talk, Cooper Union Summer STEM Annual Assembly.
- June 2016, 2017 Guest lecture on Reinforcement Learning, Columbia University, COMS 4701 Artificial Intelligence.
- June 2016, "Accurate Crowd-labeling using Item Response Theory", Poster Presentation, Collective Intelligence, NYC.
- May 2016, "*Modeling Uncertainty and Its Implications in Complex Interdependent Networks"*, Naval Postgraduate Schools 9th Annual Acquisition Research Symposium, Monterey, CA.
- Jan 2015, "Coordinating Actions Across Agent Boundaries", Invited Talk, Computer Science Department Seminar Series, Indian Institute of Technology, Chennai.
- November 2014 "The Dynamics of Glass Ceilings", Invited Talk, Albert Nerken School of Engineering Society of Women Engineers (SWE) SWEet Talk Series.

- Invited faculty speaker at UNCC Association of Computing Machinery - Women (ACM-W) "Women in the Field of Technology" event, April 2013.
- May 2013, "Using Conflict Resolution to Inform Decentralized Learning", Twelfth International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2013), St. Paul, Minnesota.
- May 2012, "*"Facilitating Decision Choices with Cascading Consequences in Interdependent Networks"*, Naval Postgraduate School 9th Annual Acquisition Research Symposium, Monterey, CA.
- April 2011, *"Coordinating about Coordination"*, Invited Talk,Lesser's "First 50": Celebrating the First 50 Years of Victor Lesser's Career in Computing, University of Massachusetts, Amherst.
- November 2010, "Formalizing Distributed Coordination in Complex Agent Systems", Invited Talk, CUNY Computer Science Colloquia, CUNY Grad Center, NY, NY.
- September 2010, "*Predictive Analytics Using a Blackboard-based Reasoning Agent*", IEEE/ WIC/ ACM International Conference on Intelligent Agent Technology (IAT-2010), Toronto, Canada.
- May 2010, "*Acquisition Risks in a World of Joint Capabilities*", Naval Postgraduate Schools 7th Annual Acquisition Research Symposium, Monterey, CA.
- March 2009, "*A Blackboard-based Approach towards Predictive Analytics"*, AAAI Spring Symposium on Technosocial Predictive Analytics, Stanford University, CA.
- October 2008 *Metalevel Control Across Agent Boundaries*, Invited Talk, School of Interactive Computing, Georgia Institute of Technology, Atlanta, GA.
- July 2008 *Coordinating Agents' Meta-level Control*, AAAI 2008, Workshop on Metareasoning: Thinking about Thinking, Chicago, IL.
- June 2008 *Agent-based Computing*, Invited Talk, , UNCC Diversity In information Technology Institute NSF REU program.
- May 2008 *Controlling Deliberation in a Markov Decision Process-Based Agent*, Seventh International Joint Conference on Autonomous Agents and Multi-Agent Systems (AAMAS08), Estoril, Portugal.
- Invited Lecture, January 2008 *Distributed Computing*, ITIS 1203 Survey of Computing, Software and Information Systems
- May 2007 *Design Paradigms for Meta-Control in Multi-Agent Systems*, AAMAS 2007 Workshop on Metareasoning in Agent Based Systems, Honolulu, HI.
- May 2007 *Introspective Self-Explanation in Analytical Agents*, AAMAS 2007 Workshop on Metareasoning in Agent Based Systems, Honolulu, HI.
- July 2006 Reasoning about Information Foraging Pacific National Labs, Pasco, WA.
- May 23, 2006 *Leveraging Problem Classification in Online Meta-Cognition*, DARPA PI Meeting, Las Vegas, NM.
- March 21, 2006 *Leveraging Problem Classification in Online Meta-Cognition*, AAAI 2006 Spring Symposium on Distributed Plan and Schedule Management, Stanford, CA, March 2006.
- Invited Talk, February 24, 2006 *Doing the Right Thing in Multi-Agent Systems*, Computer and Information Sciences Colloquium Series, Temple University, Philadelphia.
- December 1, 2005 *A Decision-Theoretic Approach to Information Foraging*, Visual Analytics Center, UNCC.
- November 2005 *MultiAgent Systems*, Invited Lecture, UNCC Freshmen Learning Seminar.
- September 2005 *MetaCognition in COORDINATORs*, DARPA PI Meeting, Boston, MA.
- November 2004 MultiAgent Systems. Invited Lecture, UNCC Freshmen Learning Seminar.
- March 2004 *Reasoning about Coordination Costs in Resource-Bounded Multi-Agent Systems, AAAI* 2004 Spring Symposium on Bridging the multiagent and multirobotic research gap, Stanford, CA, March 2004
- December 2003 *Meta-leve*l *Control in Bounded-Rational Agents*. Department Seminar, University of Maryland Baltimore County.
- April 2003 *Meta-level Control in Bounded-Rational Agents*. Invited Talk at Machine Learning and Friends Lunch Seminar, Department of Computer Science, University of Massachusetts.
- July 2002 *Meta-level Control in Multi-Agent Systems*. AAAI/KDD/UAI-2002 Joint Workshop on Real-Time Decision Support and Diagnosis Systems, Edmonton, Alberta, Canada.
- March 2002 Substitute Presenter *Social Pathologies of Adaptive Agents* by David Jensen and Victor Lesser. AAAI SSS-2002 Safe Learning Agents Symposium.

- June 2000 *Toward Robust Agent Control in Uncertain Environments.* Autonomous Agents 2000, Barcelona, Spain.
- June 2000 *Integrating High-Level and Detailed Agent Coordination into a Layered Architecture* Workshop on MAS Infrastructure and Requirements. Autonomous Agents 2000, Barcelona, Spain
- March 2000 *Reasoning about Uncertainty in Design-to-Criteria Scheduling,* AAAI 2000 Spring Symposium on Real Time Autonomous Systems.
- July 1999 *Recent Extensions to BIG: A Resource-Bounded Information Gathering System,* AAAI 1999 Workshop on Intelligent Information Systems.
- July 1998 *BIG: A Resource-Bounded Information Gathering Agent.* AAAI 1998 Technical Session.
- July 1998 Co-presented the work on *A Resource-Bounded Interpretation-Centric Approach to Information Gathering* poster session, AAAI 1998 Workshop on Information Integration.

11. Selected Media

External

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- Grad Center Article on AI to determine Preeclampsia Risks, June 2022
- Hunter College-Columbia University Team Win NIH Data Challenge, Feb 2022
- Science Goes to the Movies: "Free Guy" Meets Real AI, Interview with CUNY TV, Dec 2021.
- Listed in Crain's New York Business 2019 New York Notable Women in Tech, May 2019.
- Quoted in Crain's New York Business article "Overcoming obstacles, meeting demands, staying the course", April 2019.
- Meredith Hawkins and **Anita Raja**, Coming Together to Help Amputees in Uganda, The Doctors Tablet Blog, Albert Einstein School of Medicine, May 2017, (Media Link).
- Interviewed for and quoted in NBC Tech Innovation article "Out of Milk? Someday your Smart Home Could Fix it" by Keith Wagstaff, October 1, 2014. http://www.nbcnews.com/tech/innovation/out-milk-someday-your-smart-home-could-fix-n214921. Raja was co-contributor to the UMass intelligent home project in the late 90s.

Internal

- Small Robots,Big Opportunities News story on AAAI 2020 Robotics workshop I co-chaired.
- Research highlighted in the Cooper Union Foundation Building Colonnade windows during Inaugration week of President Sparks here and here, February 2018.
- Cooper Pioneer, March Madness 2016: Faculty Research Presentations http://pioneer.cooper.edu/2016/04/04/march-madness-thinking/; Video: https://vimeo.com/163312979
- Cooper Pioneer, March Madness 2015: Faculty Research Presentations http://pioneer.cooper.edu/2015/04/14/march-madness-faculty-research-presentations/
- Cooper Union to Offer Free MOOCs: http://www.cooper.edu/engineering/news/cooper-union-offer-free-moocs

12. Professional Affiliations

- Lifetime Member of Association for the Advancement of Artificial Intelligence (AAAI).
- Voting Member of The International Foundation for Autonomous Agents and Multiagent Systems (IFAAMAS).
- Member of American Computing Machinery (ACM).

13. Community Engagement

- Guest Expert on CUNY TV Science Goes to the Movies "Free Guy Meets Real A.I.", December 2021.
- Moderator, National Council on Artificial Intelligence, Panel on Standards and Assessments in the Finance Industry.

- Moderator, Vellore Christian Medical College Foundation Lecture Series, Philip Yancey on "God, Medicine, and the Pandemic", Nov 2021 https://www.youtube.com/watch?v=4sIgdPACs-Y
- Lecture Finalist Judge, Icahn School of Medicine 2019 hackathon on "AI in Medicine" held February 2020. https://health.mountsinai.org/health-hackathon/
- Board Member, Vellore Christian Medical College Foundation, June 2019 – Present, Member of Oration Committee (2019), Nominating Committee (2020-2022), Development Committee (2020-2021); Finance Committee (2021-2022).
- Evaluator for Icahn School of Medicine 2018 Hackathon on Rare Diseases, November 2018.
- Member of Corporation for the Vellore Christian Medical College Foundation, 2017-Present.
- Member of 2016 Hope for New York Community Grant Circle.
- Judge, Invention Factory 2016 and 2017, Cooper Union, http://inventionfactory.org/;
- Nominated for and attended Fourth Annual Council on Foreign Relations College and University Educators Workshop, April 16-17, 2015, NY, NY.
- Judge, HackCooper 2015, The Cooper Union https://www.hackerleague.org/hackathons/hackcooper-2015/hacks; Faculty Advisor, HackCooper 2018.
- Invited Talk, "Information Technology and Education: Opening Doors for Service in India", India Harvest 2010 conference.
- Volunteer judge at Greater Charlotte Christian Communicators Debate Competitions, 2007, 2008.
- Invited talk, "Careers in Computer Science", Agape Ministry of Computing for People with Disabilities, 2006.
- Two day course on Computer Basics for forty 6th to 8th graders from villages in South India, 2006.

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