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CURRICULUM VITAE

TABLE of CONTENTS

CAREER OBJECTIVE: To lead cutting-edge research in network algorithms with intensive international collaboration, involving students from high school to PhD level, with follow through to real-world applications.

A. BACKGROUND

i. EDUCATION

(Aug 92 – June 98)	Carnegie Mellon University	(Pittsburgh, Pensylvannia)

Ph.D. in Algorithms, Combinatorics and Optimization, School of Computer Science, Advisor: Prof. Bruce Maggs.
Thesis title: *On Distributed Network Resource Allocation*

(Aug 92 – Aug 95)	Carnegie Mellon University	(Pittsburgh, Pensylvannia)

M.Sc. in Algorithms, Combinatorics and Optimization, School of Computer Science

(Mar 89 – Feb 92)	Federal University of Rio de Janeiro	(Rio de Janeiro, Brazil)

M.Sc. in Systems and Computer Eng., emphasis in Algorithms/Combinatorics COPPE. Advisor: Jayme L. Szwarcfiter.
Thesis title: *Generation and Enumeration of Linear Extensions of Partially Ordered Sets*

(Jan 85 – July 89)	Federal University of Rio de Janeiro	(Rio de Janeiro, Brazil)

B.S. cum laude in Computer Science

ii. ACADEMIC APPOINTMENTS

(Aug 22 – present)	**President's Professor**, Arizona State University (ASU)	(Tempe, Arizona)

(Mar 22 – present)	**Associate Director**, interim School of computing and Augmented Intelligence (SCAI) Arizona State University (ASU)	(Tempe, Arizona)

(Aug 16 – present)	**Full Professor**, Computer Science and Engineering (CSE), School of Computing and Augmented Intelligence (SCAI)[1], Arizona State University (ASU)	(Tempe, Arizona)

(Aug 98 – present)	**Honors Faculty**, Barrett Honors College, ASU	(Tempe, Arizona)

(Aug 18 – present)	**Associate Faculty**, Center for Bio-computing, Security and Society, Biodesign Institute, ASU	(Tempe, Arizona)

(May 18 – present)	**Associate Faculty,** Center for Human, AI, and Robot Teaming, Global Security Initiative, ASU	(Tempe, Arizona)

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[1] Formerly School of Computing, Informatics and Decision Systems Engineering (CIDSE)

(Aug 15 – present) **Associate Faculty**, The Biomimicry Center at ASU   (Tempe, Arizona)

(Aug 04 – Jul 16)[2] **Associate Professor**, tenured, Computer Science and Engineering (CSE),
School of Computing, Informatics, and Decision Systems Eng. (CIDSE),
Arizona State University (ASU)   (Tempe, Arizona)

(Aug 98 – July 04) **Assistant Professor**, CSE Department, ASU   (Tempe, Arizona)

Additional Graduate Faculty Appointments

(Sep 20 – present) **Graduate Faculty**, Data Science, Analytics and Eng. PhD program (DSAE),
School of Computing and Augmented Intelligence (SCAI),
Arizona State University (ASU)   (Tempe, Arizona)

(Aug 12 – present) **Graduate Faculty**, Computer Engineering PhD program (CEN),
School of Computing and Augmented Intelligence (SCAI),
Arizona State University ASU)   (Tempe, Arizona)

Visiting Appointments

(June – July 01) Visiting Professor at University of Nice/ INRIA, hosted by Dr. Afonso Ferreira.
(Nice, France)

(Nov – Dec 96) Visiting Researcher at DIMACS (Center for Discrete Math. And Comp. Sci.),
hosted by Dr. Satish Rao, NEC Research Institute   (Princeton, New Jersey)

(June – Sep 96) Visiting Researcher, Computer Sci. Dept., University of Texas at Austin,
hosted by Prof. Greg Plaxton.   (Austin, Texas)

(June – Sep 94) Visiting Researcher at DIMACS, hosted by Prof. R.E. Tarjan, Princeton
University   (Princeton, New Jersey)

iii. PRINCIPAL AREAS OF RESEARCH AND TEACHING

Teaching   Algorithms and Data Structures;
Distributed Computing;
Network Algorithms;
Combinatorial Optimization

Research   Design and Analysis of Algorithms: network algorithms; graph algorithms;
randomized and approximation algorithms;
Distributed Computing and Algorithms;
Wireless Ad-Hoc Networks; Overlay Networks;
Combinatorial Optimization;
Self-stabilizing and self-organizing systems;
Biologically-inspired algorithms

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[2] Family/maternity leaves: 50%FTE during 08/2005-12/2007 and 01-05/2011, and 25%FTE during 08/2004-05/2005.

B. HONORS and AWARDS

(August 2022)   ***President's Professor***, ASU

Designation as a President's Professor is one of Arizona State University's most prestigious faculty honors. It is designed to reward enthusiasm and innovation in teaching, the ability to inspire original and creative work by students, mastery of subject matter and scholarly contributions. Overall, only about 1% of the tenure-track faculty at ASU receives such an honor.

(April 2021)   **Faculty's Women Association (FWA) Outstanding Faculty Mentor** Award, ASU

(2020-21)   ASU Leadership Academy Fellow

(May 2017)   **Best Senior Researcher Award**, School of Computing, Informatics and Decision Systems Engineering (CIDSE), ASU

(May 00 – May 06)   **NSF CAREER** Award

(Aug 92 – June 98) Graduate Research Scholarship, Carnegie Mellon University

(March 89 – Feb 92) Graduate Research Assistanship, CAPES, Brazil

C. PUBLICATIONS

Google Scholar page:
http://scholar.google.com/citations?hl=en&user=1LUuMc8AAAAJ

h-index: 37
Number of citations since 2017: 1731
Total number of citations: 5089

In the Algorithms/Theory of Computing publications below, the list of authors *always appears in alphabetical order*, and not with respect to the contribution of each author to the paper. Student co-authors at the time the paper was written are indicated in *bold*. **Conferences in Computer Science** are *fully reviewed* and often *more competitive* and with a *higher impact factor* than the CS journals. Whenever available, we indicated the *acceptance rates* for *full papers* at the respective conferences.

i. REFEREED ARCHIVAL JOURNAL PAPERS

1. Albert T. Liu, Marek Hempel, **Jing Fan Yang**, Allan M. Brooks, **Ana Pervan**, Volodymyr B. Koman, **Ge Zhang,** Daichi Kozawa, **Sungyun Yang**, Daniel I. Goldman, Marc Z. Miskin, Andrea W. Richa, Dana Randall, Todd D. Murphey, Tomás Palacios, Michael S. Strano. Colloidal Robots. *Nature Materials*, to appear.

2. **Anya Chaturvedi**, Chandra Chekuri, Andréa W. Richa, Matthias Rost, Stefan Schmid, **Jamison Weber**: Improved Throughput for All-or-Nothing Multicommodity Flows with Arbitrary Demands. *SIGMETRICS Perform. Evaluation Review*, 49(3): 22-27, 2022 (short paper)

3. **Shengkai Li, Bahnishika Dutta**, Sarah Cannon, **Joshua Daymude**, Ram Avinery, Enes Aydin, Andrea Richa, Daniel Goldman, and Dana Randall. Programming Active Granular Matter with Mechanically Induced Phase Changes. *Science Advances*, 7(17):eabe8494, 2021.

4. **William Savoie, Sarah Cannon, Joshua J. Daymude, Ross Warkentin, Shengkai Li,** Andréa W.
Richa, Dana Randall, and Daniel I. Goldman. Phototactic Supersmarticles. *Artificial Life and Robotics*, 23(4) pp. 459-468, 2018.

5. **Adrian Ogierman**, Andréa W. Richa, Christian Scheideler, Stefan Schmid, **Jin Zhang**: Sade: competitive MAC under adversarial SINR. *Distributed Computing* 31(3): 241-254 (2018)

6. **Joshua J. Daymude, Zahra Derakhshandeh, Robert Gmyr, Alexandra Porter**, Andrea W. Richa, Christian Scheideler, **Thim Strothmann**: On the runtime of universal coating for programmable matter. *Natural Computing* 17(1): 81-96 (2018)

7. **Marta Andres Arroyo, Sarah Cannon, Joshua J. Daymude**, Dana Randall, Andrea W. Richa: A stochastic approach to shortcut bridging in programmable matter. *Natural Computing* 17(4): 723-741 (2018)

8. Sandor P. Fekete, Andrea W. Richa, Kay Roemer, Christian Scheideler: Algorithmic Foundations of Programmable Matter Dagstuhl Seminar 16271. *Bulletin of the EATCS* 122 (2017)

9. Sandor P. Fekete, Andrea W. Richa, Kay Roemer, Christian Scheideler: Algorithmic Foundations of Programmable Matter Dagstuhl Seminar 16271. *SIGACT News* 48(2): 87-94 (2017)

10. **Zahra Derakhshandeh, Robert Gmyr**, Andrea W. Richa, Christian Scheideler, **Thim Strothmann**: Universal coating for programmable matter. *Theoretical Computer Science* 671: 56-68 (2017)

11. G. Konjevod, A. Richa, **D. Xia**. Scale-Free Compact Routing Schemes in Networks of Low Doubling Dimension. *ACM Transactions on Algorithms (TALG),* 12 (3), 2016

12. Melih Onus and Andréa W. Richa. Parameterized Minimum Degree Publish-Subscribe Overlay Network Design. *Communications Networks*, 94: 307-317 (2016).

13. Andréa W. Richa, Christian Scheideler. Jamming-Resistant MAC Protocols for Wireless Networks. *Encyclopedia of Algorithms*, pages 999-1002, 2016.

14. Yuval Rabani, Andréa W. Richa, Jared Saia, David P. Woodruff. Editorial to the Special Issue on SODA'12. ACM Transactions on Algorithms 12(1): 1:1, (2016)

15. **Nadi Ilker Bozkurt**, Hai Huang, Bruce Maggs, Andrea Richa, Maverick Woo. Mutual Embeddings. *Journal of Interconnection Networks (JOIN),* 15(1-2), 2015.

16. Riko Jacob, Andrea Richa, Christian Scheideler, Stefan Schmid, and **Hanjo Täubig**. A Polylogarithmic Time Construction for Distributed Self-Stabilizing Skip Graphs. *Journal of the ACM (JACM)*, Volume 61 Issue 6, Article no. 36 (pages 36:1-36:265, November 2014.

17. Andrea Richa and Christian Scheideler. Adversarial Models for Wireless Communication. *Encyclopedia of Algorithms*, pages 1-5, Dec 2014.

18. Baruch Awerbuch, Andréa Richa, Christian Scheideler, Stefan Schmid, **Jin Zhang**. Principles of Robust Medium Access and an Application to Leader Election. *ACM Transactions on Algorithms*, 10(4): 24 (2014)

19. Mauro M. Coutinho, Alon Efrat, Thienne Johnson, Andrea Richa and **Mengxue Liu**. Healthcare Supported by Data Mule Networks in Remote Communities of the Amazon Region. *International Scholarly Research Notices*, vol. 2014, Article ID 730760, 2014.

20. **Dominik Gall**, Riko Jacob, Andrea Richa, Christian Scheideler, Stefan Schmid, and **Hanjo Taeubig**. A Note on the Parallel Runtime of Self-Stabilizing Graph Linearization. *Theory of Computing Systems* 55(1): 110-135, 2014.

21. Andréa W. Richa, Stefan Schmid, Christian Scheideler, and **Jin Zhang**. Competitive throughput in multi-hop wireless networks despite adaptive jamming. *Distributed Computing* 26(3): 159-171 (2013)

22. Andrea Richa, Christian Scheideler, Stefan Schmid, **Jin Zhang**. An Efficient and Fair MAC Protocol Robust to Reactive Interference. *IEEE/ACM Transactions on Networking* 21(3): 760-771 (2013)

23. **Dejun Yang**, Guoliang Xue, **Jin Zhang**, Andréa W. Richa, Xi Fang: Coping with a Smart Jammer in Wireless Networks: A Stackelberg Game Approach. *IEEE Transactions on Wireless Communications* 12(8): 4038-4047 (2013)

24. Melih Onus and Andréa W. Richa. Minimum Degree Publish-Subscribe Overlay Network Design. *IEEE Transactions on Networking*, volume 19(5), pages 1331-1343, 2011.

25. **L. Ritchie, S. Deval**, A. Richa and M. Reisslein. Evaluation of Physical Carrier Sense Based Spanner Construction and Maintenance as well as Broadcast and Convergecast in Ad Hoc Networks. *Ad Hoc Networks,* volume 7(7), pages 1347-1369, 2009.

26. **S. Deval, L. Ritchie**, A. Richa and M. Reisslein. Evaluation of Physical Carrier Sense Based Spanner Maintenance in Mobile Ad Hoc Networks. *International Journal of Vehicular Technology*, vol. 2009, Article ID 958056, 13 pages, 2009. doi:10.1155/2009/958056.

27. **S. Oh, Y. Huh, B. Kulapala**, A. Richa and M. Reisslein. Continuous-Time Collaborative Prefetching of Continuous Media. *IEEE Transactions on Broadcasting,* volume 54, issue 1, pages 36-52, 2008.

28. **H.-S. Yang, L. Ritchie**, A. Richa and M. Reisslein. MANET Routing with Provably Low Complexity Through Constant Density Clustering and Route Request Broadcast, *Wireless Personal Communications*, Volume 43, Number 2, pages 605-621, October 2007.

29. **L. Ritchie, H.-S. Yang**, A.W. Richa, and M. Reisslein. Cluster Overlay Broadcast (COB): MANET Routing with Complexity Polynomial in Source-Destination Distance. *IEEE Transactions on Mobile Computing*, Volume 5, Issue 6, pages 653 - 667, June 2006.

30. **Hai Huang**, Andréa W. Richa, Michael Segal. Dynamic Coverage in Ad-Hoc Sensor Networks. *ACM Baltzer Journal on Mobile Networks and Applications (MONET)* 10(1-2): 9-17 (2005).

31. **S. Oh, Y. Huh, B. Kulapala**, G. Konjevod, A.W. Richa, M. Reisslein. A modular algorithm-theoretic framework for the fair and efficient collaborative prefetching of continuous media. *IEEE Transactions on Broadcasting,* volume 51 issue 2, pages 200- 215, 2005.

32. S. Rao and A. W. Richa. New Approximation Techniques for Some Linear Ordering Problems. *SIAM Journal of Computing*, Volume 34, Number 2, pages 388 - 404, 2005.

33. **H. Huang**, A.W. Richa, and M. Segal. Approximation Algorithms for the Mobile Piercing Set Problem with Applications to Clustering in Ad-Hoc Networks. *ACM Baltzer Journal on Mobile Networks and Applications (MONET)*, Volume 9, Number 2, pages 151-161, April 2004.

34. A. Ferreira, S. Perennes, A.W. Richa, **H. Rivano,** and **N. Stier**. Models, complexity, and algorithms for the design of multifiber WDM networks. *Telecommunication Systems* 24(2-4): 123-138 (2003).

35. F. T. Leighton, B. M. Maggs, and **A. W. Richa**. Fast Algorithms for Finding O(Congestion + Dilation) Packet Routing Schedules, *Combinatorica*, 19(2):1--27, 1999.

36. C. G. Plaxton, **R. Rajaraman**, and **A. W. Richa**. Accessing Nearby Copies of Replicated Objects in a Distributed Environment, *Theory of Computing Systems (TOCS)*, 32:241-280, 1999. (Invited submission)

37. B. Ghosh, F. T. Leighton, B. M. Maggs, S. Muthukrishan, C. G. Plaxton, **R. Rajaraman, A. W. Richa**, R. E. Tarjan, and D. Zuckerman. Tight Analysis of Two Local Load Balancing Algorithms. *SIAM Journal on Computing*, 29(1), pages 29-64, 1999.

In submission:

1. Joshua J. Daymude, Andréa W. Richa, Christian Scheideler: The Canonical Amoebot Model: Algorithms and Concurrency Control. Submitted to *Distributed Computing*, 2022.

2. **Anya Chaturvedi**, Chandra Chekuri, Andréa W. Richa, Matthias Rost, Stefan Schmid, **Jamison Weber**: Arbitrary Throughput Approximation for All-or-Nothing Multicommodity Flows with Arbitrary Demands. Submitted to *IEEE Transactions on Networking*, 2022 (full paper)

3. **Ana Pervan, Jamison Weber, Thomas Berrueta, Anya Chaturvedi,** Andrea W. Richa, Todd D. Murphey. Bayesian Particle Learning for Intelligent Matter. To be submitted to *Nature*, 2022.

ii. INTERNATIONAL CONFERENCE PROCEEDINGS REFEREED PAPERS

1. **Shunhao Oh**, Dana Randall, Andréa W. Richa: Brief Announcement: Foraging in Particle Systems via Self-Induced Phase Changes. *Proceedings of the 36th International Symposium on Distributed Computing (DISC)*, 2022, to appear.

2.

3. Joshua J. Daymude, Andréa W. Richa, Christian Scheideler: Local Mutual Exclusion for Dynamic, Anonymous, Bounded Memory Message Passing Systems. *Proceedings of 1st Symposium on Algorithmic Foundations of Dynamic Networks (SAND),* 12:1-12:19, 2022.

4. Joshua J. Daymude, Andréa W. Richa, Christian Scheideler: The Canonical Amoebot Model: Algorithms and Concurrency Control. Proceedings of the *35th International Symposium in Distributed Computing (DISC)*, *20:1-20:19,* 2021.

5. Joshua J. Daymude, **Noble C. Harasha**, Andréa W. Richa, **Ryan Yiu**: Deadlock and Noise in Self-Organized Aggregation Without Computation (invited paper). Proceedings of the *23rd International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS)*, pages 51-65, 2021.

6. **Joshua J. Daymude,** Andréa W. Richa**, Jamison W. Weber:** Bio-Inspired Energy Distribution for Programmable Matter. Proceedings of *International Conference on Distributed Computing and Networking (ICDCN)*, pages 86-95, 2021.

7. **Joshua J. Daymude**, Robert Gmyr, **Kristian Hinnenthal**, Irina Kostitsyna, Christian Scheideler, Andrea W. Richa: Convex Hull Formation for Programmable Matter. ICDCN 2020: 2:1-2:10

8. Sarah Cannon**, Joshua J. Daymude, Cem Gökmen,** Dana Randall, Andréa W. Richa: *A Local Stochastic Algorithm for Separation in Heterogeneous Self-Organizing Particle Systems*. APPROX-RANDOM 2019: 54:1-54:22, 2019.

9. **John Calvin Alumbaugh, Joshua J. Daymude,** Erik D. Demaine, Matthew J. Patitz, Andréa W. Richa: *Simulation of Programmable Matter Systems Using Active Tile-Based Self-Assembly*. DNA 2019: 140-158, 2019.

10. **Mengxue Liu,** Andrea W. Richa**, Matthias Rost,** Stefan Schmid. A Constant Approximation for Maximum Throughput Multicommodity Routing. In Proceedings of *IEEE INFOCOM*, pages 46-54, 2019.

11. **Sarah Cannon, Joshua J. Daymude, Cem Gokmen**, Dana Randall, Andrea W. Richa: Brief Announcement: A Local Stochastic Algorithm for Separation in Heterogeneous Self-Organizing Particle Systems. In Proceedings of *ACM Symposium on Principles of Distributed Computing (PODC),* 2018: 483-485

12. **Alexandra Porter**, Andrea W. Richa. Collaborative Computation in Self-organizing Particle Systems. *UCNC* 2018: 188-203

13. Lorenzo Alvisi, Idit Keidar, Andrea W. Richa, Alexander A. Schwarzmann: 2018 Doctoral Dissertation Award. In Proceedings of *ACM Symposium on Principles of Distributed Computing (PODC)* 2018: 3

14. **Sarah Cannon, Joshua J. Daymude, William Savoie, Ross Warkentin, Shengkai Li,** Daniel I. Goldman, Dana Randall, Andréa W. Richa: Phototactic Supersmarticles. Appeared at the *2nd International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM '17),* 2017.

15. **Joshua J. Daymude, Robert Gmyr**, Andrea W. Richa, Christian Scheideler, **Thim Strothmann:** Improved Leader Election for Self-organizing Programmable Matter. *ALGOSENSORS* 2017: 127-140

16. **Taeyeong Choi**, Theodore P. Pavlic, Andrea W. Richa: Automated synthesis of scalable algorithms for inferring non-local properties to assist in multi-robot teaming. *CASE* 2017: 1522-1527

17. **Marta Andres Arroyo, Sarah Cannon, Joshua J. Daymude**, Dana Randall, Andrea W. Richa. A Stochastic Approach to Shortcut Bridging in Programmable Matter. *DNA* 2017: 122-138

18. **Mengxue Liu**, Andrea W. Richa: Interest- and Content-Based Data Dissemination in Mobile Social Networks. *IEEE GLOBECOM* 2017: 1-6

19. **Sarah Cannon, Joshua J. Daymude**, Dana Randall, Andréa W. Richa. A Markov Chain Algorithm for Compression in Self-Organizing Particle Systems. In Proceedings of *ACM Symposium on Principles of Distributed Computing (PODC),* pages 279-288, 2016.

20. **Zahra Derakhshandeh**, **Robert Gmyr, Alexandra Porter**, Andréa W. Richa, Christian Scheideler, **Thim Strothmann**. On the Runtime of Universal Coating for Programmable Matter. In *Proceedings of 22nd^t International Conference on DNA and Molecular Computing (DNA22),* pages 148-164, 2016.

21. **Zahra Derakhshandeh, Robert Gmyr**, Andréa W. Richa, Christian Scheideler, **Thim Strothman**. Universal Shape Formation for Programmable Matter. To appear in *Proceedings of ACM Symposium on Parallelism in Algorithms and Architecture (SPAA),* 2016.

22. **Mengxue Liu, Rachit Agarwal,** Andrea Richa, Thienne Johnson, Alon Efrat, and Mauro M. Coutinho. Robust Data Mule Networks with Remote Healthcare Applications in the Amazon Region: A Fountain Code Approach. To appear in *ACM HealthCom'15*. (Acceptance rate: ~30%)

23. **Zahra Derakhshandeh, Robert Gmyr, Thim Strothmann**, Andrea W. Richa, Christian Scheideler, and Rida Bazzi. Leader Election and Shape Formation with Self-Organizing Programmable Matter. In *Proceedings of 21st International Conference on DNA and Molecular Computing (DNA21)*, pages 117-132, 2015

24. **Zahra Derakhshandeh, Robert Gmyr, Thim Strothmann**, Andrea W. Richa, and Christian Scheideler. Work-in-progress: An Algorithmic Framework for Shape Formation Problems in Self-Organizing Particle Systems. In *Proceedings of 2nd ACM International Conference on*

Nanoscale Computing and Communication (NANOCOM), 2015.

25. **Xinhui Hu, Arne Ludwig**, Andréa W. Richa, Stefan Schmid. Competitive Strategies for Online Cloud Resource Allocation with Discounts: The 2-Dimensional Parking Permit Problem. To appear in Proceedings of *IEEE International Conference on Distributed Computing Systems (ICDCS*), 2015. (Acceptance rate: ~15%)

26. **Zahra Derakhshandeh, Robert Gmyr, Thim Strothmann**, Rida Bazzi, Andrea Richa and Christian Scheideler. Brief Announcement: On the Feasibility of Leader Election and Shape Formation with Self-Organizing Programmable Matter. To appear in *Proceedings of ACM Symposium on Principles of Distributed Computing (PODC*), 2015*,*

27. **Chenyang Zhou, Anisha Mazumder**, Arunabha Sen, Martin Reisslein, Andrea Richa. On Shortest Single/Multiple Path Computation Problems in Fiber-Wireless (FiWi) Access Networks. In *Proceedings of the IEEE 15th International Conference on High Performance Switching and Routing (IEEE HPSR), pages 131-137, 2014.*

28. **Adrian Ogierman**, Andréa W. Richa, Christian Scheideler, Stefan Schmid, **Jin Zhang**: Competitive MAC under adversarial SINR. In *Proceedings of the IEEE 33rd Conference on Computer Communications (INFOCOM)*, pages 2751-2759, 2014 (Acceptance rate: 19%)

29. **Zahra Derakhshandeh**, Shlomi Dolev, **Robert Gmyr**, Andréa W. Richa, Christian Scheideler, **Thim Strothmann**: Brief announcement: AMOEBOT - a new model for programmable matter. In *Proceedings of the ACM Symposium on Parallelism in Algorithms and Architectures (SPAA),* pages 220-222, 2014.

30. Andres Mora, **David Ganger, Greg Wells, Jin Zhang, Xinhui Hu, Chenyang Zhou**, Andrea Richa, Cody Youngbull. Ad-Hoc multihop underwater optical network for deep ocean monitoring. In *Proceedings of MTS\IEEE OCEANS*, pages 1-5, 2013.

31. **Xinhui Hu**, Stefan Schmid, Andréa W. Richa, Anja Feldmann: Optimal Migration Contracts in Virtual Networks: Pay-as-You-Come vs Pay-as-You-Go Pricing. In *Proceedings of IEEE ICDCN*, pages 285-299, 2013.

32. **Dejun Yang, Jin Zhang, Xi Fang**, Andréa W. Richa, Guoliang Xue: Optimal transmission power control in the presence of a smart jammer. In *Proceedings of IEEE GLOBECOM*, pages 5506-5511, 2012.

33. Andréa W. Richa, Christian Scheideler, Stefan Schmid, **Jin Zhang**: Competitive and fair throughput for co-existing networks under adversarial interference. In *Proceedings of the ACM Symposium on Principles of Distributed Computing (PODC),* pages 291-300, 2012.

34. Andrea Richa, Christian Scheideler, Stefan Schmid, and **Jin Zhang**. Self-Stabilizing Leader Election for Single-Hop Wireless Networks despite Jamming. In *Proceedings of the 12th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MOBIHOC),* 2011.

35. Andréa W. Richa, Stefan Schmid, Christian Scheideler, and **Jin Zhang**. Competitive and Fair Medium Access despite Reactive Jamming. To appear in *Proceedings of the IEEE 31st International Conference on Distributed Computing Systems (ICDCS),* pages 507-516, 2011. (Acceptance rate: ~13%.)

36. Goran Konjevod, Andréa W. Richa, Donglin Xia, Ling Zhou. Brief Announcement: Randomized compact routing in decomposable metrics. In *Proceedings of the ACM Symposium on Principles of Distributed Computing (PODC),* pages 351-352, 2011.

37. Andréa W. Richa, Christian Scheideler, **Phillip Stevens**. Self-Stabilizing De Bruijn Networks. In *Proceedings of the 13th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS)*, pages 416-430, 2011.

38. Andréa W. Richa, Stefan Schmid, Christian Scheideler, and **Jin Zhang**. A Jamming Resistant MAC Protocol for Multi-Hop Wireless Networks. In *Proceedings of the 24th International Symposium on Distributed Computing (DISC)*, pages 179-193, 2010.

39. Andrea Richa, Christian Scheideler, Stefan Schmid, and **Jin Zhang**. Towards Jamming-Resistant and Competitive Medium Access in the SINR Model. In *Proceedings of the Third Annual ACM s3 Workshop*, Las Vegas, Nevada, USA, September 2010.

40. Fabian Kuhn, Nancy Lynch, Calvin Newport, **Rotem Oshman**, Andrea Richa. Broadcasting in Radio Networks with Unreliable Communication. In *Proceedings of the 29th ACM Symposium on Principles of Distributed Computing (PODC)*, July, 2010. (Acceptance rate: 22%)

41. Andréa W. Richa, Stefan Schmid, Christian Scheideler, and **Jin Zhang**. Brief Announcement: A Jamming Resistant MAC Protocol for Multi-Hop Wireless Networks. In *Proceedings of the 29th ACM Symposium on Principles of Distributed Computing (PODC)*, July, 2010.

42. Melih Onus and Andréa W. Richa. Parameterized Minimum Degree Publish-Subscribe Overlay Network Design. In *Proceedings of the 30th IEEE International Conference on Distributed Computing Systems (ICDCS)*, June, 2010. (Acceptance rate: 14%)

43. **Dominik Gall**, Riko Jacob, Andrea Richa, Christian Scheideler, Stefan Schmid, and **Hanjo Taeubig**. On the Time Complexity of Distributed Topological Self-Stabilization. In Proceedings of *LATIN'10*, pages 294-305, 2010.

44. **Melih Onus** and Andréa W. Richa. Minimum Degree Publish-Subscribe Overlay Network Design. In *Proceedings of the IEEE 28th Conference on Computer Communications (INFOCOM)*, pages 882-890, 2009. (Acceptance rate: 19.6%)

45. Riko Jacob, Andrea Richa, Christian Scheideler, Stefan Schmid, and **Hanjo Täubig**. A Polylogarithmic Time Construction for Distributed Self-Stabilizing Skip Graphs. In *Proceedings of ACM Symposium on Principles of Distributed Computing (PODC)*, pages 131-140, 2009. (Acceptance rate: 25%)

46. **Melih Onus** and Andréa W. Richa. Brief Announcement: Parameterized Maximum and Average Degree Approximation in Topic-based Publish-Subscribe Overlay Network Design. In *Proceedings of the 21st ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 39-40, 2009.

47. **Dominik Gall**, Riko Jacob, Andrea Richa, Christian Scheideler, Stefan Schmid, and **Hanjo Taeubig**. Brief Announcement: On the Time Complexity of Distributed Topological Self-Stabilization. To appear in *Proceedings of the 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS)*, pages 781-782, 2009.

48. Christian Scheideler, Andréa W. Richa, and Paolo Santi. An O(log n) Dominating Set Protocol for Wireless Ad-Hoc Networks under the Physical Interference Model. In *Proceedings of the 9th ACM Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc)*, pages 91-100, 2008. (Acceptance rate: 14.6%)

49. Baruch Awerbuch, Andréa W. Richa and Christian Scheideler. A Jamming-Resistant MAC Protocol for Single-Hop Wireless Networks. In *Proceedings of ACM Symposium on Principles of Distributed Computing (PODC)*, pages 45-54, 2008.

50. Goran Konjevod, Andréa W. Richa, **Donglin Xia**. Dynamic Routing and Location Services in Low Doubling Dimension. In *Proceedings of the 22nd International Symposium on Distributed Computing (DISC)*, pages 379-393, 2008.

51. Goran Konjevod, Andréa W. Richa, **Donglin Xia**. Brief Announcement: Dynamic Routing and Location Services in Low Doubling Dimension. In *Proceedings of ACM Symposium on Principles of Distributed Computing (PODC)*, page 417, 2008.

52. Goran Konjevod, Andréa W. Richa, **Donglin Xia, Hai Yu**. Compact routing with slack in low doubling dimension. In *Proceedings of ACM Symposium on Principles of Distributed Computing (PODC)*, pages 71-80, 2007. (Acceptance rate: 16%)

53. Goran Konjevod, Andréa W. Richa, and **Donglin Xia**. Optimal scale-free compact routing schemes in doubling networks. In *Proceedings of ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 939-948, 2007. (Acceptance rate: 33%)

54. **Melih Onus**, Andrea W. Richa, and Christian Scheideler,. Linearization: Locally Self-Stabilizing Sorting in Graphs. In Proceedings of ACM Workshop on Experimental Algorithms *ALENEX'07,* 2007.

55. G. Konjevod, A.W. Richa, **D. Xia.** Optimal Stretch Name-Independent Compact Routing in Doubling Metrics. In *Proceedings of 18th ACM Symposium on Principles of Distributed Computing (PODC),* pages 198-207, 2006. (Acceptance rate: 24%)

56. **T-H. H. Chan, D. Xia**, G. Konjevod, A. Richa. A Tight Lower Bound for Steiner Point Removal Problem on Trees , In *Proceedings of APPROX-RANDOM* , pages 70-81, 2006.

57. **D. Xia**, G. Konjevod, and A. Richa. On sampling in higher-dimensional peer-to-peer systems. In *Proceedings of LATIN'06*, pages 641-652, 2006.

58. **Kishore Kothapalli**, **Melih Onus**, Andrea W. Richa, Christian Scheideler. Constant density spanners for wireless ad-hoc networks. In *Proceedings of the 17th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 116-125, 2005.

59. **K. Kothapalli, M. Onus**, A. Richa and C. Scheideler. Efficient Broadcasting and Gathering in Wireless Ad Hoc Networks. In Proceedings of the *IEEE International Symposium on Parallel Architectures, Algorithms and Networks (ISPAN)*, pages 346-351, 2005.

60. **Liang Yang, Tushar Gohad, Pavel Ghosh, Devesh Sinha**, Arunabha Sen, Andrea Richa. Resource mapping and scheduling for heterogeneous network processors. In *Proceedings of the 2005 ACM Symposium on Architecture for networking and communications systems (ANCS)*, 2005.

61. A. Ferreira, S. Perennes, A.W. Richa, **H. Rivano,** and **N. Stier**. Models, complexity, and algorithms for the design of multifiber WDM networks. In *Proceedings of IEEE International Conference on Telecommunications (ICT)*, pages 12--18, 2003.

62. **H. Huang**, A.W. Richa, and M. Segal. Approximation Algorithms for the Mobile Piercing Set Problem with Applications to Clustering. In *Proceedings of 6th ACM Workshop on Discrete Algorithms and Method for Communication (DIAL-M)*, pages 52-61, August 2002.

63. A. Ferreira, S. Perennes, A.W. Richa, **H. Rivano,** and **N. Stier**. On the design of multifiber WDM networks. In *Proceedings of AlgoTel'02*, pages 25--32, France, 2002.

64. Goran Konjevod, **Soohyun Oh**, and Andréa W. Richa. Finding Most-Sustainable Paths in Networks with Time-Dependent Edge-Reliabilities. In *Proceedings of Latin American Theoretical INformatics (LATIN)*, pages 435-450, 2002.

65. A.W. Richa, K. Obraczka, and A. Sen. Application-oriented Self-organizing Hierarchical Clustering in Dynamic Networks. In *Proceedings of 1st ACM Workshop on Principles of Mobile Computing (POMC),* pages 57-65, 2001.

66. R. Rajaraman, A.W. Richa, B. Voecking, and **G. Vuppuluri**. A data tracking scheme for general networks. In *Proceedings of 13th Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA),* pages 247-254, 2001.

67. A. W. Richa, A. Sen, **B. H. Shen**, and S. Bandyopadhyay. On Routing and Wavelength Assignment in Optical Networks. In *Proceedings of the Thirty-Eighth Annual Allerton Conference on Communication*, Control and Computing, pages 2000.

68. S. Rao and **A. W. Richa.** New Approximation Techniques for Some Ordering Problems. In *Proceedings of Ninth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 211-218, 1998.

69. R. Cole, B. M. Maggs, F. Meyer auf der Heide, M. Mitzenmacher, **A. W. Richa,** K. Schroder, R. K. Sitaraman, and B. Vocking. Randomized Protocols for Low-Congestion Circuit Routing in Multistage Interconnection Networks. In *Proceedings of the 30th Annual Symposium on the Theory of Computing (STOC)*, pages 378-388, 1998.

70. R. Cole, A. Frieze, B. M. Maggs, M. Mitzenmacher**, A. W. Richa**, R. K. Sitaraman, and E. Upfal. On Balls and Bins with Deletions. In *Proceedings of the Second International Workshop on Randomization and Approximation Techniques in Computer Science (RANDOM),* number 1518 in Lecture Notes in Computer Science, pages 145-158, 1998.

71. C. G. Plaxton, **R. Rajaraman,** and **A. W. Richa**. Accessing Nearby Copies of Replicated Objects in a Distributed Environment, In *Proceedings of Ninth ACM Symposium on Parallel Algorithms and Architectures (SPAA),* pages 311-320, 1997.

72. B. Ghosh, F. T. Leighton, B. M. Maggs, S. Muthukrishan, C. G. Plaxton, **R. Rajaraman, A. W. Richa**, R. E. Tarjan, and D. Zuckerman. Tight Analysis of Two Local Load Balancing Algorithms, In *Proceedings of the 27th Annual Symposium on the Theory of Computing (STOC)*, pages 548-558, 1995.

In submission:

1. **Joseph Briones, Tishya Chhabra**, Joshua J. Daymude, Andrea W. Richa. Asynchronous Deterministic Leader Election in Three-Dimensional Programmable Matter. Submitted to *International Conference on Distributed Computing and Networking (ICDCN)*, 2023.

iii. BOOK PUBLISHING

(a) Edited Books

1. Andrea Werneck Richa, Christian Scheideler (Eds.): Structural Information and Communication Complexity - 27th International Colloquium, SIROCCO 2020, Paderborn, Germany, June 29 - July 1, 2020, Proceedings. Lecture Notes in Computer Science 12156, Springer 2020, ISBN 978-3-030-54920-6

2. Andréa W. Richa (Ed.): Proceedings of 31st International Symposium on Distributed Computing, DISC 2017, October 16-20, 2017, Vienna, Austria. LIPIcs 91, Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik 2017, ISBN 978-3-95977-053-8

3. Yuval Rabani, Andréa W. Richa, Jared Saia, David P. Woodruff (eds.): Special Issue on SODA'12. ACM Trans. Algorithms 12(1), 2016.

4. Andréa W. Richa, Christian Scheideler (Eds.): Stabilization, Safety, and Security of Distributed Systems - 14th International Symposium, SSS 2012, Toronto, Canada, October 1-4, 2012. Proceedings. Lecture Notes in Computer Science 7596, Springer 2012, ISBN 978-3-642-33535-8

5. Andréa W. Richa, Thomas Moscibroda (Eds.): Ad Hoc Networks Special Issue on Algorithmic Aspects of Ad Hoc Networks. Ad Hoc Networks, 2012.

6. Andréa W. Richa, Thomas Moscibroda (Eds.): Proceedings of the DIALM-POMC Joint Workshop on Foundations of Mobile Computing, Cambridge, Massachusetts, USA, September 16, 2010. ACM 2010, ISBN 978-1-4503-0413-9

7. Andréa W. Richa, Rachid Guerraoui (Eds.): Proceedings of the 29th Annual ACM Symposium on Principles of Distributed Computing, PODC 2010, Zurich, Switzerland, July 25-28, 2010. ACM 2010, ISBN 978-1-60558-888-9Proceedings of the 29th Annual ACM Symposium on Principles of Distributed Computing (PODC), 2010

8. Andréa W. Richa, Arunabha Sen, Katia Obraczka (Eds.). Proceedings of Second IEEE Workshop on Network Science for Communication Networks (NetSciCom), 2010

9. Andréa W. Richa, Arunhaba Sen, Katia Obraczka (Eds.). Proceedings of First IEEE Workshop on Network Science for Communication Networks (NetSciCom), 2009

10. Andréa W. Richa, Jennifer L. Welch (Eds.): MONET Special Issue on Foundations of Mobile Computing. MONET 11(2), 2006

11. Andréa W. Richa, Jennifer Welch (Eds.). Proceedings of ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (DIALM-POMC), 2003.

(b) Book Chapters

1. **Joshua J. Daymude, Kristian Hinnenthal**, Andréa W. Richa, Christian Scheideler: Computing by Programmable Particles. *Distributed Computing by Mobile Entities, LNCS 1340,* 2019: 615-68, Springer.

2. Andréa W. Richa, Christian Scheideler, Stefan Schmid: Overlay Networks for Peer-to-Peer Networks. Handbook of Approximation Algorithms and Metaheuristics (2), 2nd edition, 2018

3. A.W. Richa and C. Scheideler. Overlay Networks for Peer-to-peer systems. In Teofilo Gonzales (Editor), *Handbook of Approximation Algorithms and Metaheuristics*, Chapman & Hall / CRC Press, Chapter 72, 2007.

4. M. Mitzenmacher, A. Richa, and R. Sitaraman. The power of two random choices: A survey of the techniques and results. In *Handbook of Randomized Computing,* volume I, edited by P. Pardalos, S. Rajasekaran, and J. Rolim, pages 255-305, Kluwer Press, 2000.

v. INVITED PRESENTATIONS

- **Keynote Speaker,** *Algorithmic Programmable Matter (from Markov Chains to Dumb Robots),* 22nd International Symposium on Stabilization, Safety, and Security of Distributed Systems **(SSS)**, 2020.

- **Keynote Speaker,** *Algorithmic Foundations of Programmable Matter,* 21st International Conference on Distributed Computing and Networking (**ICDCN**), 2020.

- **Invited Speaker,** *Algorithmic Foundations of Programmable Matter,* Workshop on Distributed Algorithms for Dynamic Networks (**DiADN**), co-located with DISC'19, 2019.

- **Track Keynote Speaker.** *Algorithmic Foundations of Programmable Matter,* CNS track, SpringSim conference, Tucson, April 2019.

- **Keynote Speaker,** *Algorithmic Foundations of Programmable Matter,* 13th Latin American Theoretical INformatics Symposium (**LATIN**), 2018.

- **Invited Speaker, Biomimicry Center at ASU Launch Event,** *Smart Matter,* ASU, March 2015.

- **Keynote Speaker,** *Adversarial Models for Wireless Communication,* 20th International Conference on AD-HOC Networks & Wireless (**SIROCCO**), 2013.

- **Plenary Speaker,** *Interference Models: Going Beyond the Unit-disk and Packet-Radio Models,* 6th International Conference on AD-HOC Networks & Wireless (**AD-HOC NOW**), 2007.

- **Tutorial,** *Self-organizing Particle Systems,* 16th International Symposium on Stabilization, Safety, and Security of Distributed Systems (**SSS**), 2014.

- **Tutorial** *Algorithmic Foundations of Ad Hoc Networks,* MICS Summer School, ETH Zurich, June 30 – July 04, 2004.

- *Algorithmic Programmable Matter: An Overview,* Special Seminar, Department of Chemical Engineering, MIT, 2022.

- *Algorithmic Programmable Matter: From Local Markov Chains to "Dumb" Robots,* Computer Science Theory seminar, MIT, 2022.

- *Algorithmic Programmable Matter: From Local Markov Chains to "Dumb" Robots,* Computer Science Colloquium, University of New Mexico, 2022.

- *Algorithmic Matter*, Chalk Talk, Biodesign Institute, Arizona State University, 2021.

- *Algorithmic Foundations of Programmable Matter,* TRIPODS Colloquium series, University of Arizona, 2019.

- *Separation in Self-organizing Particle Systems, 6th* Biological Distributed Algorithms (**BDA**) Workshop, co-located with DISC'18, London, UK, October 2018.

- *Algorithmic Foundations of Programmable Matter*, AMS Special Session on Emergent Phenomena Discrete Models, Joint Mathematical Meeting session, 2018

- *Algorithmic Foundations of Programmable Matter,* Universidade Federal do Rio de Janeiro, Brazil, June 2018.

- *Algorithmic Foundations of Programmable Matter,* Women in Computer Science: Lunch and Learn, ASU, April 2018.

- *Programmable Matter: Models and Problems, ARC* Colloquium, School of Computer Science, Georgia Tech, September 2015.

- *Programmable Matter: Models and Problems,* CS Faculty Series, CIDSE, ASU, March 2015.

- *Programmable Matter: Models and Problems,* Discrete Math Seminar, ASU, March 2015.

- *Algorithmic Foundation of Self-organizing Particle Systems and of Wireless Communication,* University of South Florida, March 2015.

- *Programmable Matter: Models and Problems,* Sch. of Math. and Natural Sci., ASU West, March 2015.

- *Programmable Matter: Models and Problems,* Math Club, ASU, November 2014.

- *Programmable Matter: Models and Problems, 2nd* Biological Distributed Algorithms (**BDA**) Workshop, co-located with DISC'14, Austin, Texas, October 2014.

- *Amoeba-Inspired Self-Organizing Particle Systems,* NSF Workshop on Self-organizing Particle Systems, co-located with ACM-SIAM SODA'14, Portland, Oregon, January 2014.

- *Adversarial Models for Wireless Communication,* University of Paderborn, Germany, 2013.

- *Adversarial Models for Wireless Communication*, Telekom Networking Lecture Series Workshop, Technical University of Berlin, Germany, July 2011.

- *Minimum Maximum Degree Publish-Subscribe Overlay Network Design*, Arizona State University, 2011.

- *A Jamming-Resistant MAC Protocol for Single-Hop Wireless Networks*, University of Southern California, October, 2010.

- *On Parameterized Minimum Degree Publish-Subscribe Overlay Network Design*, Federal University of Rio de Janeiro, Brazil, 2010.

- *An O(log n) Dominating Set Protocol for Wireless Ad-Hoc Networks under the Physical Interference Model,* Massachusetts Institute of Technology (MIT), 2009

- *An O(log n) Dominating Set Protocol for Wireless Ad-Hoc Networks under the Physical Interference Model,* University of Paderborn, Germany, 2009

- *A Jamming-Resistant MAC Protocol for Single-Hop Wireless Networks*, Federal University of Rio de Janeiro, Brazil, 2009.

- *A Jamming-Resistant MAC Protocol for Single-Hop Wireless Networks*, Texas A&M University, 2008.

- *Interference Models: Going Beyond the Unit-disk and Packet-Radio Models,* Federal University of Rio de Janeiro, Brazil, 2008.

- *Interference Models: Going Beyond the Unit-disk and Packet-Radio Models,* University of Arizona, 2007.

- *Beyond the Unit-disk and Packet Radio Models,* Dagstuhl Seminar 07151 Geometry in Sensor Networks, Schloss Dagstuhl , Germany , 2007

- *Beyond the Unit-disk and Packet Radio Models,* NSF Workshop on Geometric Approaches to Ad Hoc and Sensor Networks, University of California, Santa Barbara, 2006.

- *A Data Tracking Scheme for General Networks*. Informs Telecom'02, Boca Raton, FL, 2002.

- *A Data Tracking Scheme for General Networks*. Federal University of Rio de Janeiro, Brazil, 2001.

- *On Balls-and-bins with Deletions.* Federal University of Rio de Janeiro, Brazil, 2000.

- *Accessing Nearby Copies of Replicated Objects in a Distributed Environment*. INFORMS'00, San Antonio, TX, 2000.

- *Accessing Nearby Copies of Replicated Objects in a Distributed Environment.* Federal University of Rio de Janeiro, Brazil, 2000.

- *New Approximation Techniques for Some Ordering Problems.* Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, 1998.

- *New Approximation Techniques for Some Ordering Problems,* Bell Labs/DIMACS (Center for Discrete Math. And Comp. Sci.), Murray Hill, NJ, 1998.

- *Accessing Nearby Copies of Replicated Objects in a Distributed Environment,* ASU, Tempe, AZ, 1998.

- *Accessing Nearby Copies of Replicated Objects in a Distributed Environment*, Los Alamos National Labs, Los Alamos, NM, 1998.

- *Accessing Nearby Copies of Replicated Objects in a Distributed Environment,* ASU/ACM student chapter, Tempe, AZ, 1998.

- *New Approximation Techniques for Some Ordering Problems*, University of Texas at Austin, Austin, TX, 1997.

D. GRANTS

i. AWARDED PROPOSALS

Total Awarded Funds: $ 13,323,767.00
Total Individual Shares: $ 4,144,718.50

Duration	Title	Sponsor	Award	PIs	Individual Share
(2021-24)	Collaborative Research: AF: Medium: Markov Chain Algorithms for Problems from Computer Science, Statistical Physics and Self-Organizing Particle Systems	National Science Foundation (NSF) – Algorithmic Foundation	$1,200,000	A. Richa (lead PI), and D. Randall (Georgia Tech)	43%
(2019-24)	**MURI:** Formal Foundations of Algorithmic Matter and Emergent Computation	Army Res. Office (ARO), **MURI-DoD**	$6,000,000	A. Richa, D. Randall (lead PI) and D. Goldman (Georgia Tech), Jeremy England and Michael Strano (MIT), Todd Murphey (Northwestern)	15%
(2018-21)	REU: Distributed and Stochastic Algorithms for Active Matter: Theory and Practice	National Science Foundation (NSF) – REU	$32,000	A. Richa (lead PI)	100%
(2018-21)	Distributed and Stochastic Algorithms for Active Matter: Theory and Practice	National Science Foundation (NSF) – Algorithms in the Field (AiTF)	$600,000	A. Richa (lead PI), D. Randall and D. Goldman (Georgia Tech)	33%
(2018-19)	Self-Organized Cyber Defense in Networks	ASU-BGU (Ben Gurion U., Israel) seed grant	$30,000	A. Richa (ASU lead PI), C. Avin (BGU lead PI)	50%
(2016-19)	Exploratory: A Distributed and	NSF – Algorithms in the Field (AiTF)	$300,000	A. Richa (lead PI), D. Randall,	37%

	Stochastic Algorithmic Framework for Active Matter			and D. Goldman (GeorgiaTech)	
(2014-19)	Self-organizing Particle Systems	National Science Foundation (NSF) – Algorithmic Foundation (AF)	$482,000	A. Richa (lead PI)	100%
(2013-15)	EAGER: Self-organizing Particle Systems: Models and Algorithms	National Science Foundation (NSF) – Algorithmic Foundation (AF)	$176,000	A. Richa (lead PI)	100%
(2012)	SSS'12 Travel Scholarships	National Science Foundation (NSF)	$10,000	A. Richa (lead PI)	100%
(2011-14)	Adversarial Models for Wireless Communication	NSF –Algorithmic Foundations (AF), and Office of Int. Sci. and Eng. (OISE)	$379,392	A. Richa (lead PI)	100%
(2008-12)	Theory of Self-Stabilizing Overlay Networks	NSF--Theoretical Foundations (TF) and OISE	$170,163	A. Richa (lead PI)	100%
(2008-11)	Dynamic Routing, Distributed Hash Tables and Location Services	NSF-TF	$109,253	A. Richa (lead PI) (Goran Konjevod was a former co-PI, ASU)	100%
(2008-12)	Academic and Professional Development for Lower Division Computer Science, Engineering, and Mathematics Students: Transition to Upper Division, Research and the STEM Workforce	NSF – DUE	$ 600,000	Armando Rodriguez (lead PI), A. Richa, Carlos Castillo-Chavez, Mary Anderson-Rowland (ASU)	13%

(2007-11)	Academic and Professional Development for Upper Division CS, Eng., and Math. Students - II: Transition to Research, Graduate School, and the Workforce	NSF - DUE	$ 600,000	Armando Rodriguez (lead PI), A. Richa, Carlos Castillo-Chavez, Mary Anderson-Rowland (ASU)	8%
(2006-07)	LANL Internship: Efficient Shortest Path Computation In Planar Graphs	Los Alamos National Laboratories (LANL),	$20,964	A. Richa (lead PI)	100%
(2006-10)	Academic and Professional Development for Upper Division Computer Science, Engineering, and Mathematics Students - II: Transition to Research, Graduate School, and the Workforce	NSF - DUE	$ 500,000	Mary Anderson-Rowland (lead PI), A. Richa, Armando Rodriguez, Carlos Castillo-Chavez (ASU)	8%
(2004-05)	Multi-Application Partitioning System (Maps) - A Design Tool For Hardware/Software Partitioning Of Network Processor Systems	Consortium for Embedded Internetworking & Technologies (CEINT)	$86,357	Arun Sen (lead PI, ASU), A. Richa	50%
(2004-06)	Academic And Professional Development For Computer Science; Engineering; And Mathematics Students: Transitioning To Upper Division; Research; Grad...	NSF-DUE	$450,000	Joaquin Bustoz (lead PI), A. Richa, Armando Rodriguez (ASU)	33%

(2003-04)	A Case for an Inexpensive, Highly Available iSCSI Storage Solution	CEINT	$85,357.00	Arun Sen (lead PI, ASU), A. Richa	50%
(2003-04)	Hardware-Software Co-Design of Network Processors and Packet Classification	CEINT	$81,357.00	Arun Sen (lead PI, ASU), A. Richa	50%
(2003)	DIALM-POMC Workshop on Foundations of Mobile Computing	NSF	$5,000.00	A. Richa (lead PI)	100%
(2003)	DIALM-POMC Workshop on Foundations of Mobile Computing	CEINT	$3,000.00	A. Richa (lead PI)	100%
(2002-03)	Development of an iSCSI Storage Manager with Virtualization for eLinux on Intel 80321 I/O Processor	CEINT	$77,032	Arun Sen (lead PI, ASU), A. Richa	50%
(2001-03)	Computer Science, Engineering, and Mathematics Scholarship Program (for Freshmen and Sophomores),	NSF-DUE	$270,000	Joaquin Bustoz (lead PI), A. Richa, Armando Rodriguez (ASU)	33%
(2001-02)	Packet Processing in a QoS Constrained Environment	CEINT	$70,794	Arun Sen (lead PI, ASU), A. Richa	50%
(2000-06)	**CAREER:** Accessing Shared Objects and Routing in Distributed Environments	NSF	$273,598 (includes matching funds)	A. Richa (lead PI)	100%
(2000-04)	Computer Science, Engineering, and Mathematics Scholarship Program (for	NSF-DUE	$504,500	Joaquin Bustoz (lead PI), A. Richa, Armando Rodriguez, Barbara Gannod,	20%

	Juniors and Seniors)			James Turner (ASU)	
(1999-2003)	Parallel Elimination Orders with applications in Operations Research and Scientific Computing	NSF-Theoretical Foundations	$200,000	Gary Miller, Bruce Maggs, R. Ravi (Carnegie Mellon U.), A. Richa (ASU)	25%
(1998-99)	FGIA: Accessing Shared Objects in a Distributed Environment	ASU	$7,000	A. Richa (lead PI)	100%

ii. OTHER PROJECTS (see Section K)

- *A data mule network focused on Amazon riverine population with e-health applications (CoDPON):*

  http://www.margalho.pro.br/codpon/ .

- *Underwater optical ad-hoc sensor networks*:

  http://www.uontechnologies.com/

E. PATENTS

- Patent AZTE.P0104US.P1 , UNDERWATER MULTI-HOP COMMUNICATIONS NETWORK
  (see Section K)

F. ENTREPRENEURIAL

- *UON Technologies*, founding partner, www.uontechnologies.com
  (see Section K)

G. GRADUATE STUDENT THESES AND DISSERTATIONS SUPERVISED
i. MASTER'S THESIS AWARDED

Student	Degree	Duration	Thesis Title	Employment after Graduation
Gayathri Vuppuluri	MS	(1999-2000)	A near-optimal data access scheme in a distributed environment	Compaq (now HP)
Srinivas Sardar	MCS	(1998-99)	Development of Multiport Load Balancing Tool for Distributed Networks	Compaq (now HP)
Anshul Dawra	MS	(1999-2001)	Most sustainable path routing	IBM
Soohyun Oh	MS	(1999-2001)	Finding most sustainable paths in networks with time-dependent edge reliabilities	PhD at ASU
Hai Huang	MS	(2000-03)	Approximation algorithms for the mobile piercing set problem with applications to Clustering in Ad-Hoc Networks	Intel
Shiva Sundararaman	MS	(2001-03)	Algorithm for flow allocation for multi-protocol label switching	Qualcom
James Higgins	MCS	(2004-06)	Location Service in Mobile Networks: An Overview	Intellitel
Rumana Islam	MCS	(2006-08)	Linear Programming Formulations for Minimizing Maximum Interference in Wireless Networks	MBA at ASU
Michael Reeves	MS	(2013-15)	The Effects of Bollinger Bands on Delta Probability	
Rachit Agarwal	MS in CE	(2014-15)	Incorporating Uncertainties into Data Mule DTN Networks, with focus on an Amazon scenario	
Anya Chaturvedi	MS, thesis	(2018-20)	Improved Bi-criteria Approximation for the All-or-Nothing Multicommodity Flow Problem in Arbitrary Networks	Intel

ii. MS IN PROGRESS

Student	Degree	Duration	Thesis Title

iii. Ph.D. THESES AWARDED

Student	Degree	Duration	Thesis Title	Employment after Graduation
Soohyun Oh	PhD	(2001-05)	Collaborative prefetching frameworks of continuous media	Sungkyunkwan University, South Korea
Donglin Xia*	PhD	(2004-08)	Compact Routing Design in Networks of Low Doubling Dimension	Microsoft Research
Melih Onus	PhD	(2003-09)	Overlay Network Construction in Highly Decentralized Networks	Bilkent University, Turkey
Antonio Cardenas	PhD	(2004-10)	Detecting Sybil Nodes in Static and Dynamic Networks	Universidad Autonoma de Mexico, Mexicali, Mexico
Oleg Bakun	PhD	(2005-11)	Adaptive Decentralized Routing and Detection of Overlapping Communities	
Jin Zhang	PhD	(2008-12)	Jamming-resistant MAC protocols	Google
Xinhui Hu	PhD	(2010-15)	Resource allocation with Applications on the Cloud	Google
Zahra Derakhshandeh	PhD	(2012-17)	Algorithmic Foundations of Self-organizing Particle Systems	Tenure-track faculty, Cal State East Bay
Chenyang Zhou	PhD	(2012-18)	Design, Analysis and Computation in Wireless and Optical Networks	Google\Facebook
Mengxue Liu	PhD	(2014-18)	Data Routing and Dissemination in Delay Tolerant Networks	Facebook
Joshua Daymude	PhD	(2016-21)	Coordinating in Motion: Distributed and Stochastic Algorithms for Emergent Behavior in Programmable Matter	ASU

* Donglin Xia received the *Best CSE PhD Student Award*, 2008, and the Best CSE TA Award, 2007.

iv. Ph.D. THESES IN PROGRESS

Student	Degree	Duration
Anya Chaturvedi	PhD	(2022-present)
Joseph Briones	PhD	(2020-present)
Jamison Weber	PhD	(2019-present)

Prof. Richa was also a member of hundreds of MS and PhD thesis committees at ASU and other institutions.

PhD Thesis Examinee\Reviewer:
- Mirjam Wattenhofer, *Distributed Coordination: Collecting, Locking, and Matching*, ETH Zurich, 2006.
- Arne Ludwig, Technical University of Berlin, Germany, 2016.
- Thim Strothmann, University of Paderborn, Germany, 2017
- Robert Gmyr, University of Paderborn, Germany 2018

v. UNDERGRADUATE HONORS THESIS (ASU Barrett Honors College)

Student	Duration	Project Title
Rebecca Martin	(2019-21)	Target Detection Using Algorithmic Matter
Joseph Briones	(2018-20)	Programmable Matter in Three Dimensions
Kevin Lough	(2017-19)	Enumeration Methods and Series Analysis of Self-Avoiding Polygons on the Hexagonal Lattice with Applications to SOPS
Andrew Stanton	(2017-18)	Network Algorithms for Reducing Spread of Infection
Waverly Roeger	(2016-17)	Maze Generation
Xiao Wang	(2015-18)	Overlay Network Design by Pruning
Alexandra Porter	(2015-17)	Cooperative Data Operations in Programm. Matter
Joshua Daymude	(2014-16)	Self-organizing Particle Systems: Compaction
Miles Laff	(2014-15)	Expansion Algorithms for Self-Organizing Particle Systems
Ryan Sowa	(2011-13)	Extending NS-3 for 3D Wireless Networks
Christopher F. Shiflet	(2001-02)	Analysis of Mobility Models in MANETs

See Section J.iv for more on Undergraduate Research

H. PROFESSIONAL and SCIENTIFIC SERVICE

i. SCIENTIFIC and PROFESSIONAL SOCIETY MEMBERSHIPS

- Association of Computer Machinery (ACM)
- IEEE Computer Society

ii. EDITORSHIPS

- **Associate Editor**, IEEE Transactions on Mobile Computing, IEEE publishing (2012-17).

- **Associate Editor**, Ad-Hoc Networks, Springer-Verlag (2010-12).

- **Guest Editor,** ACM Baltzer Journal on Mobile Networks and Applications (MONET) Special Issue on "Foundations of Mobile Computing", 11(2), 2006.

- **Guest Editor**, Ad-Hoc Networks (Springer-Verlag) Special Issue on "Algorithms for Ad-Hoc and Sensor Networks", to appear.

- **Guest Editor**, ACM Transactions on Algorithms, Invited papers from ACM SODA'12.

- Proceedings of ACM **DIALM-POMC** Joint Workshop on Foundations of Mobile Computing, 2003.

- Proceedings of First IEEE Workshop on Network Science for Communication Networks (**NetSciCom**), 2009

- Proceedings of ACM **DIALM-POMC** Joint Workshop on Foundations of Mobile Computing, 2010.

- Proceedings of First IEEE Workshop on Network Science for Communication Networks (**NetSciCom**), 2010

- Proceedings of the 29th Annual ACM Symposium on Principles of Distributed Computing (**PODC**), 2010

- Proceedings of the Thirteenth International Symposium on Stabilization, Safety, and Security of Distributed (**SSS**), 2012

- Proceedings of the International Symposium on Distributed Computing (**DISC**), 2017

- Proceedings of the 7th International Colloquium on Structural Information and Communication Complexity (**SIROCCO**), 2020

iii. COMMUNITY LEADERSHIP

- **Creation of ACM EiG\SIG in Distributed Computing.**

  As the DISC Steering Committee Chair, and together with Chryssis Georgius, PODC SC chair, Jukka Suomela and Hagit Attiya, we are leading the creation of an ACM Special Interest Group (SIG) in Distributed Computing (the initial process at ACM is to establish an Emerging Interest Group, EiG). The flagship conferences for this SIG will be ACM Principles of Distributed Computing (PODC) and EATCS (European Association for Theoretical Compute Science) sponsored Int. Symposium on Distributed Computing (DISC). This process will also involve establishing DISC as an ACM-EATCS jointly sponsored conference,

iv. CONFERENCE ACTIVITIES

Program Chair

- 27th International Colloquium on Structural Information and Communication Complexity (**SIROCCO**), 2020
- International Symposium on Distributed Computing (**DISC**), 2017
- Thirteenth International Symposium on Stabilization, Safety, and Security of Distributed (**SSS**), 2012
- ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (**DIALM-POMC**), 2010
- Second IEEE Workshop on Network Science for Communication Networks (**NetSciCom**), 2010
- First IEEE Workshop on Network Science for Communication Networks (**NetSciCom**), 2009
- ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (**DIALM-POMC**), 2003

General Chair

- Dagstuhl Workshop on "Algorithmic Foundation of Programmable Matter", July 2016, Germany.
- NSF Workshop on Self-organizing Particle Systems (**SOPS**), 2014
- Third IEEE Workshop on Network Science for Communication Networks (**NetSciCom**), 2011
- ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC**), 2010
- First Arizona Workshop on Algorithms, Arizona State University, 2001.

Founder

- NSF Workshop on Self-organizing Particle Systems (**SOPS**), 2014
- IEEE Workshop on Network Science for Communication Networks (**NetSciCom**), held in conjunction with IEEE INFOCOM.

Steering Committee Chair

- International Symposium on Distributed Computing (**DISC**), 2020—present.

- IEEE Workshop on Network Science for Communication Networks (**NetSciCom**), 2011—present

Steering Committee Vice-Chair

- International Symposium on Distributed Computing (**DISC**), 2018--2020

Track Chair

- Special Track on "Algorithmic Foundations of Biological-inspired Systems", **SIROCCO**, 2015

- Special Track on "Special Models for Distributed Computation", **SIROCCO**, 2023

Steering Committee Member

- ACM Workshop on Foundations of Mobile Computing (**FOMC**; formerly known as **DIALM-POMC**), 2010—present.

- ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC**), 2008-2011

- International Symposium on Distributed Computing (**DISC**), 2017--2018

Organizer

- Dagstuhl Workshop on "Algorithmic Foundation of Programmable Matter", July 2016, Germany.

- AMS Special Session on Emergent Phenomena in Discrete Models, Joint Math. Meeting, 2018

Treasurer

- ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC**), 2009

Publicity chair

- ACM Symposium on Parallelism in Algorithms and Architectures (**SPAA**), 2007 – 2011

Program Committee Member

- Twelfth ACM Symposium on Parallelism in Algorithms and Architectures (**SPAA**), 2000

- Fourth ACM International Workshop on Discrete Algorithms and Methods for Mobile Computing and Communications (**DIAL-M**), 2000

- Fifth ACM International Workshop on Discrete Algorithms and Methods for Mobile Computing and Communications (**DIAL-M**), 2001

- IEEE International Conference on High Performance Computing (**Hi-PC**), 2001

- Fourth ACM International Workshop on Discrete Algorithms and Methods for Mobile Computing and Communications (**DIAL-M**), 2002

- Latin American Theoretical Informatics (**LATIN),** 2004

- The 4th International Conference on Collaborative Computing: Networking, Applications and Worksharing (**CollaborateCom**), 2005

- 7th Intl. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (**WiOpt**), 2005

- The 6th ACM International Symposium on Mobile Ad Hoc Networking and Computing (**MobiHoc**), 2005

- The 5th International Conference on Collaborative Computing: Networking, Applications and Worksharing (**CollaborateCom**), 2006

- IEEE International Workshop on Foundations and Algorithms for Wireless Networking (**FAWN**), 2006

- IEEE International Conference on Distributed Computing in Sensor Systems (**DCOSS**), 2006

- IEEE International Conference on Distributed Computing in Sensor Systems (**DCOSS**), 2007

- Fourth International Conference on fun with Algorithms (**FUN**), 2007

- ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (**DIALM-POMC**), 2007

- ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (**DIALM-POMC**), 2008

- Latin American Theoretical Informatics (**LATIN**), 2008

- ACM-SIAM Symposium on Discrete Algorithms (**SODA**), 2008

- International Workshop on Algorithmic Aspects of Wireless Sensor Networks (**ALGOSENSORS**), 2008

- IEEE International Parallel & Distributed Processing Symposium (**IPDPS**), 2009

- Twenty-Eighth Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC**), 2009

- International Symposium on Distributed Computing (**DISC**), 2010.

- Twelfth International Symposium on Stabilization, Safety, and Security of Distributed (**SSS**), 2011

- Twenty-third ACM Symposium on Parallelism in Algorithms and Architectures (**SPAA**), 2011

- Thirty-first IEEE International Conference on Distributed Computing Systems (**ICDCS**), 2011

- Thirty-first IEEE International Conference on Distributed Computing Systems (**ICDCS**), 2012

- IEEE International Conference on Distributed Computing in Sensor Systems (**DCOSS**), 2012

- Latin American Theoretical Informatics (**LATIN**), 2012

- ACM-SIAM Symposium on Discrete Algorithms (**SODA**), 2012

- ACM Thirty-second Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC)**, 2012

- Twenty-fifth ACM Symposium on Parallelism in Algorithms and Architectures (**SPAA**), 2013

- International Symposium on Distributed Computing (**DISC**), 2013

- ACM Symposium on Theoretical Computer Science (**STOC**), 2013

- Latin American Theoretical Informatics (**LATIN**), 2014

- Int. Workshop on Algorithmic Aspects of Wireless Sensor Networks (**ALGOSENSORS**), 2014

- 41st International Colloquium on Automata, Languages, and Programming (**ICALP)**, 2014

- IEEE International Parallel and Distributed Processing Symposium (**IPDPS**), 2015

- SIAM Algorithm Engineering and Experiments (**ALENEX**), 2016

- ACM Thirty-sixth Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC)**, 2016

- 44st International Colloquium on Automata, Languages, and Programming (**ICALP**), 2017

- ACM Thirty-seventh Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC**), 2017

- 5th Workshop on Biological Distributed Algorithms (**BDA**), 2017

- 6th Workshop on Biological Distributed Algorithms (**BDA**), 2018

- Highlights on Algorithms (**HALG**), 2018.

- International Conference on DNA and Molecular Computing (**DNA23**), 2018

- International Symposium on Distributed Computing (**DISC**), 2018.

- International Symposium on Distributed Computing (**DISC**), 2019.

- 46st International Colloquium on Automata, Languages, and Programming (**ICALP**), 2019

- 7th Workshop on Biological Distributed Algorithms (**BDA**), 2019

- 3rd Symposium on Simplicity in Algorithms (**SOSA**), collocated with SODA'20, 2020

- Latin American Theoretical Informatics (**LATIN**), 2020

- ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC)**, 2020

- ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC)**, 2021

- Highlights on Algorithms (**HALG**), 2021.

- ACM-SIAM Symposium on Discrete Algorithms (**SODA**), 2021.

- 1st Symposium on Algorithmic Foundations of Dynamic Networks (**SAND**), 2022

- ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC)**, 2022

- SIAM Symposium on Algorithmic Principles of Computer Systems (**APOCS**), 2023

- 2nd Symposium on Algorithmic Foundations of Dynamic Networks (**SAND**), 2023

- ACM 42nd Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (**PODC)**, 2023

v. ADVISORY BOARDS

- **External Advisory Board**, School of Computer and Cyber Sciences, Augusta University, Georgia, US (2019—present)

vi. CONFERENCE, JOURNAL, and RESEARCH PROPOSAL REVIEWER

- Served as reviewer for several journals, including
  - SIAM Journal on Computing,
  - Journal of the ACM
  - IEEE Transactions on Mobile Computing
  - IEEE Transactions on Networking
  - Combinatorica,
  - Algorithmica,
  - IEEE Transactions on Computers, and
  - ACM Transactions on Algorithms
  - Distributed Computing

- Served as reviewer for several conferences, including
  - ACM-SIAM Symposium on Discrete Algorithms (SODA),
  - ACM Symposium on Theory of Computing (STOC),
  - IEEE Foundations of Computer Science (FOCS),
  - ACM Symposium on Principles of Distributed Computing (PODC)
  - ACM Symposium on Parallelism in Algorithms and Architectures (SPAA),
  - ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (DIALM-POMC),
  - International Symposium on Distributed Computing (DISC),
  - ACM International Symposium on Mobile Ad-Hoc Networking and Computing (MobiHoc), and
  - IEEE INFOCOM

- Served as reviewer/panelist for several research grant proposals, including
  - National Science Foundation (NSF)
  - Swiss National Science Foundation.
  - US-Israel Binational Science Foundation (BSF)

I. UNIVERSITY COMMITTEE SERVICE

University level

(2019—present)   ASU Full Professors of Color cohort, formed to address the process of promotion of faculty of color and underrepresented groups at ASU

(2013-present)   US-Brazil Collaboration Initiative, Vice-provost Office

(2002-03)   Clube Brasil (Brazilian Student Association), Faculty advisor

Ira A. Fulton Schools of Engineering (College level)

(2019-22)   FSE Diversity and Inclusion Initiative

(2018-19)   CIDSE Director Search Committtee

(2012-13)   IAFSE Curriculum Committee

(2011-13)   IAFSE Committee of Review

(2005-07)   IAFSE Committee of Review

(2001-02)   Self-Study Committee for CSE

(2000-01)   CSE Chair Search Committtee

School of Computing and Augmented Intelligence (Academic Unit level)

(2020-2022)   MCS Online Faculty Liason

(2020-2021)   Biodesign/CIDSE Faculty Search committee

(2019-2020)   CSE-CIDSE Graduate Program Committee

(2018-19)   CSE-CIDSE Graduate Program Committee, **Chair**

(2017-2018)   CIDSE Director Search Committee

(2017-2018)   Biodesign/CIDSE Faculty Search committee (2 lines)

(2014-2015)   Computer Engineering Graduate Comprehensive Exam Coordinator

(2001-present) CSE 450 Course Coordinator

(2001-present) Technical Area Algorithms and Theory Committee Chair

(2012-13)   CSE-CIDSE Graduate Admissions Committee

(2010-11)   CSE-SCIDSE Graduate Program Committee

(2007)   CSE Personnel Committe

(2006-07)   CSE ABET Committe

(2004-06)   CSE Graduate Program Committee

(2004-05)   CSE Faculty meeting secretary

(2003-04)   CSE Space Committee

(2003-04)   CSE Faculty Recruiting Committee

(2003)   CSE Brickyard Move Committee

(2000-02)   CSE Graduate Program Committee

(1999-2001)   CSE Initial Graduate Student Advisor

(1999-2000)   CSE Colloquium Series

(2000-01)   Chair of CSE Colloquium Series

(1998-99)   CSE TA and Financial Aid Committee

(1998-2000)   CSE Graduate Admisssions Committee

Coordinator: Creation and development of an Algorithms group and research area at the CSE Department (now CIDSE), ASU

Center affiliations

(2017—present) Associate Faculty, The Biomimicry Center at ASU

(2017—present) Associate Faculty, Center for Human, Artificial Intelligence, and Robotic Teaming (CHART), Global Security Initiative

(2018-present) Associate Faculty, Center for Bio-computation, Security, and Society, Biodesign Institute

Other

(2020—21) ASU Peer Leadership Academy

J. TEACHING RECORD

i. LIST of COURSES

Undergraduate
ASU 101 The ASU Experience
CSE 450 Design and Analysis of Algorithms
CSE 310 Data Structures and Algorithms

Graduate
CSE 552 Randomized and Approximation Algorithms
CSE 550 Combinatorial Optimization and Intractability
CSE 551 Foundations of Algorithms
CSE 598 Design and Analysis of Algorithms
CSE 591A Algorithms for Distributed and Parallel Networks
CSE 591 Theory of Wireless Communication
CSE 591 Theory of Dynamic Communication Networks

ii. TEACHING EVALUATIONS (2015-20)

In the teaching evaluations below, aggregates for the *instructor* and *course content* portions of the teaching evaluations submitted by the students to the respective classes are provided; the aggregate evaluations are on a 5-point scale.

Instructor Evaluations

Term	Course Title	Enrollment	Course	Instructor
2020 Fall	CSE 550 (ASU Synch)	45	4.63	4.68
2020 Spring	CSE 551 (Hybrid) * interrupted by covid	174	4.16	4.48
2019 Fall	CSE552 Richa	17	4.77	4.99
2019 Spring	CSE 450	113	4.68	4.82
2019 Spring	CSE 551 (Hybrid)	121	4.43	4.61
2019 Spring	CSE 551 (Online) * first offering	39	3.95	4.54
2018 Spring	CSE 450	97	4.69	4.66
2018 Spring	CSE 551	80	4.19	4.33
2017 Fall	CSE 310	110	4.62	4.57
2017 Fall	ASU 101-CSE Richa	17	4.66	4.51
2017 Fall	ASU 101-CSE Richa	19	4.07	3.89
2016 Fall	CSE 551 Richa	80	3.78	4.29
2016 Fall	CSE 552 Richa	14	4.1	3.83
2015 Spring	CSE 450 Richa	50	4.57	4.64
2015 Spring	CSE 552 Richa	16	4.47	4.44

Sample Comments from Student evaluations:

- "Overall, she knows the subject thoroughly and she is a very very dedicated teacher. Her style
  of teaching is very good. She maintains good communication channel with her students... She
  is an asset to ASU. She should be honored.";
- "Great course and one of the best instructors I've had so far at ASU, would recommend to
  anyone...";
- "Dr. Richa presented materials in a way that had logical order and just made sense. She made
  a difficult and complicated topic seem easy.";
- "I liked the fact that the instructor always cared about student's needs and comments."
- "I saw that the instructor really wanted me to learn and cared about her students. The
  assignments were stimulating and challenged me. I learned a lot and really enjoyed her teaching
  style.".
- "Richa is by far one of the best professors in the CS department."
- "Awesome professor, great attitude and enthusiasm."
- "Most well-laid out and well-designed course I took this semester. This is one I'm sure will be
  useful to me in the future!"
- "Professor was very well prepared and clear about the course. I like that she was clear with
  the expectation that what we should get out of the course is a familiarity with the different
  algorithms to help us come up with ideas to solve problems in our future jobs rather than
  focusing on memorization."
- "The material is interesting, Richa is a fantastic teacher, and it seems like a class that could
  actually be very useful in the future."
- "Dr. Richa obviously displayed enthusiasm for the subject and a willingness to cooperate with
  her students ... Her tests were fair in what they went over; we were never thrown curve balls in
  regards to the questions on the exams."
- "Richa was very enthusiastic about the material she presented on. The homework load was very
  reasonable and was more difficult than the tests, which allowed us to study well in advance."
- "The professor! Dr. Richa is an awesome and enthusiastic professor. I was always very eager
  to attend her classes, because she always did her best to make them interesting and applicable
  to the course. Her empathy towards students was also a great characteristic about her. She
  always expressed true concern in the best interest of her students. Learned so much from her!
  This course was EXTREMELY useful. I truly feel that because of this course and the guidance
  provided by Dr. Richa, I was made prepared for a variety of summer internship interviews...
  ultimately acquiring one based on my knowledge of key concepts from this course."
- "The instructor was very determined to make sure the students understood the material. ... In

addition, I thought the tests were well-written because they challenged students to not simply
memorize, but understand the various algorithms."
- "Class promoted out of the box thinking."
- "The instructor has a great passion for teaching and helping students".
- "One of the few good courses at ASU. Challenging and exciting, coupled with brilliant staff. Prof.Richa really cares about the students and was always willing to help."
- "Great professor who I've had for three classes now. I highly recommend Dr. Richa for this course [CSE 550] as well as CSE 551 and CSE 310 whenever she teaches them."

iii. NEW COURSE and COURSE MATERIAL DEVELOPED

New Courses Developed
Undergraduate\Graduate
CSE 450/598, Design and Analysis of Algorithms, **hybrid format**, Fall 2013

- I had my classes taped for this course and had the first offering of CSE 450/598 as a hybrid class in Fall 2013, Spring and Fall 2014, where students were supposed to watch the lecture videos at home and have an in-person in-class meeting once a week devoted to answering any questions the students might have, do problem solving, etc. I particularly enjoyed this innovative flipped classroom format and I think the students benefitted quite a bit from having an extra hour of instructor time every week (even if the student themselves seem to prefer the in-class lecture delivery mode).

Graduate
CSE 551 **Foundations of Algorithms,** *online,* **Spring 2019**
- This course was created from the CSE 598 Design and Analysis of Algorithms class (which was offered as an advanced undergrad and low level grad class), and is now a graduate-only class.

CSE 552 Randomized and Approximation Algorithms, Spring 2015
- While this course had already been offered at ASU, it had been offered on a sporadic basis and so I have developed my own curriculum and course material for the class in Spring 2015.

CSE 551 **Foundations of Algorithms, Spring 2015**
- This course was created from the CSE 598 Design and Analysis of Algorithms class (which was offered as an advanced undergrad and low level grad class), and is now a graduate-only class.

CSE 591, **Theory of Wireless Communication, Spring 2013**

- This course evolved from the "Theory of Dynamic Communication Networks" course outlined below, to focus solely on wireless communication aspects. The course addresses the problems of broadcasting, routing, node location services and distributed hash tables, synchronization, reliable MAC protocols, topology control, self-stabilization, etc. It also addresses the fundamental yet still evolving problem of how to provide a suitable model of wireless communication for algorithm design. This is a theoretical course that focus on algorithms with provable properties of correctness, complexity and/or optimality. Students

need to have taken CSE 450/598 or CSE 550 or CSE 552 before taking this course. A background in distributed systems or networking would be helpful, but is not essential.

CSE 591, **Theory of Dynamic Communication Networks, Spring 2010**

- This course explores the theoretical foundations of dynamic networks. The course addresses two of the foremost scenarios of recent fundamental research in this area: wireless ad-hoc networks, and overlay-based peer-to-peer distributed systems, with the main focus being on wireless ad-hoc networks. The course considers overlay network design and maintenance, topology control, routing primitives (such as point-to-point routing, broadcasting), node location services and distributed hash tables, self-stabilization, synchronization (more in the context of wireless networks), and more. It also addresses the fundamental yet still evolving problem of how to provide a suitable model of wireless communication for algorithm design. This is a theoretical course that focus on algorithms with provable properties of correctness, complexity and/or optimality. Students need to have taken CSE 450/598 or CSE 550 or CSE 552 before taking this course. A background in distributed systems or networking would be helpful, but is not essential. This course explores more *current* topics in the area of distributed algorithms than the more classical CSE591A course below.

CSE 591A, **Algorithms for Distributed and Parallel Networks, Spring 1999**

I have been the coordinator of the re-structuring of the courses in foundations of computer science at ASU. I have introduced many changes to the existing courses syllabuses, from the most basic undergraduate algorithms courses to the most advanced courses in Theory of Computing, also eliminating a large amount of overlap among the topics covered by the courses. Namely, together with other professors at CIDSE, I revised the contents of the courses CSE 205, CSE 310, CSE 450/598, CSE 550, and to some extent (in order to be compatible with the other revised courses) CSE 555. I have introduced new courses in algorithms in Spring 1999, Spring 2010, Spring 2013, and Spring 2015. Together with Prof. Konjevod, we introduced a new course in randomized and approximation algorithms, CSE 552 Randomized and Approximation Algorithms.

iv. UNDERGRADUATE PROJECTS SUPERVISED

(a) Undergraduate Thesis (ASU Barrett Honors College)

Student	Duration	Project Title
Rebecca Martin	(2019-21)	Target Detection Using Algorithmic Matter
Joseph Briones	(2018-20)	Programmable Matter in Three Dimensions
Kevin Lough	(2017-19)	Enumeration Methods and Series Analysis of Self-Avoiding Polygons on the Hexagonal Lattice, with Applications to SOPS
Andrew Stanton	(2017-18)	Network Algorithms for Reducing Spread of Infection
Waverly Roeger	(2016-18)	Maze Generation
Xiao Wang	(2015-18)	Overlay Network Design by Pruning
Alexandra Porter	(2015-17)	Cooperative Data Operations in Programmable Matter
Joshua Daymude	(2014-16)	Self-organizing Particle Systems: Compaction
Miles Laff	(2014-15)	Expansion Algorithms for Self-organizing Particle Syst.
Ryan Sowa	(2011-13)	Extending NS-3 for Three-dimensional Wireless Networks
Christopher F. Shiflet	(2001-02)	Analysis of Mobility Models in Mobile Ad-Hoc Networks

(b) Undergraduate Research

ASU Fulton Undergraduate Research Initiative (FURI)

Student	Duration	Project Title
Jennifer Harrison	(2008)	Sensor Clock Synchronization Problem with Applications in Rainforest Monitoring
Phillip Stevens	(2010-2011)	Dynamic De Bruijn Graph
Miles Laff	(2015)	Expansion Algorithms for Self-organizing Particle Systems
Joshua Daymude	(2015)	Self-organizing Particle Systems: Contracting
Kevin Lough	(2017)	Gap filling algorithm for Self-organizing Particle Systems
Christopher Boor	(2019)	Energy complexity in Self-Organizing Particle Systems
Rebecca Martin	(2020)	Target Detection Using Algorithmic Matter
Dhanush Giryian	(2022)	Decentralized Reinforcement Learning

NSF Research Experience for Undergraduates (REU)*

Student	Duration	Project Title
Phillip Stevens	(2010-11)	Theory of Self-Stabilizing Overlay Networks
Jadiel de Armas	(2011-12)	Theory of Self-Stabilizing Overlay Networks
Miles Laff	(2014-15)	EAGER: Self-organizing Particle Systems
Joshua Daymude	(2014-16)	EAGER: Self-organizing Particle Systems
Alexandra Porter	(2015-17)	EAGER: Self-organizing Particle Systems
Kevin Lough	(2016-19)	AiTF: Distributed and Stochastic Framework for Active Matter
Joseph Briones	(2017-20)	Self-organizing Particle Systems and AiTF: Distributed and Stochastic Framework for Active Matter
Ryan Yiu	(2018-19)	Self-organizing Particle Systems and AiTF: Distributed and Stochastic Framework for Active Matter

Christopher Boor	(2019)	AiTF:Distributed and Stochastic Framework for Active Matter
Ziad Abdelkarim	(2019-20)	AiTF:Distributed and Stochastic Framework for Active Matter
Rebecca Martin	(2020-21)	AiTF:Distributed and Stochastic Framework for Active Matter
Noble Harasha	(2021)	Markov Chain Algorithms for Problems from CS, Statistical Physics and Self-Organizing Particle Systems
Tishya Chhabra	(2022)	Markov Chain Algorithms for Problems from CS, Statistical Physics and Self-Organizing Particle Systems
Briggs Richardson	(2022-23)	Markov Chain Algorithms for Problems from CS, Statistical Physics and Self-Organizing Particle Systems

* All projects are supplementary to my NSF projects of the same title.

NASA Space Grant

Student	Duration	Project Title
Rebecca Martin	(2020-21)	Target Detection Using Algorithmic Matter

(c) Honors Projects (ASU Barrett Honors College), Footnote 18 (2014-20)

CSE 450, Spring 2014: 2 projects

CSE 450, Fall 2014: 1 project

CSE 450, Spring 2015: 2 projects

CSE 310, Fall 2017: 2 projects

CSE 450, Spring 2018: 3 projects

CSE 450, Spring 2019: 6 projects

v. HIGH SCHOOL STUDENTS SUPERVISED

Noble Harasha, McClintock HS, Tempe Union HS District,AZ   (2020-21)

Tishya Chhabra, Corona del Sol HS, Tempe Union HS District, AZ   (2021-22)

Aryan Shah, Hamilton HS, Chandler HS District, AZ   (2022-preesnt)

K. SELECTED SYNERGETIC and OUTREACH ACTIVITIES

- **High School Outreach.** I developed an outreach brochure and activity sheet for high schoolers called *The Superpowers of Swarms,* in which I lead activities to show how computer scientists take inspiration from nature, such as ants, bees and fish, to help robot swarms perform tasks. The developed materials to reach out to *local high schools* and also on an *ASU outreach project to high school girls in Kenya* (through a partnership with the Mandela Washington Foundation). Both outreach efforts have been very successful: I have had three recent high school students, one current, from local Tempe and Chandler public high schools actively working in my group; for the Kenya project, I will quote from an article on the ASU Kenya outreach project (https://asunow.asu.edu/interests/community?page=1): ``the girls were "blown away" at how accessible Richa made these advanced technical concepts seem by how she related them to concepts the girls were familiar with."

- **Promote more female and Hispanic students in Computer Science:** As a female professor in Computer Science, it is my goal to encourage more female students to pursue or further continue their studies in Computer Science, which has proven successful, given that I have graduated four female PhD students, four female MS students, and five female undergraduate researchers, with one current female PhD student. Moreover, since I am also of Hispanic origin, I strive to serve as a role model in the classroom for the under-represented Hispanic students in CS at ASU. My accomplishments in student mentoring, especially of underrepresented groups in CS were recognized through my 2021 ASU Faculty's Women Association Outstanding Faculty Mentor award and also through my appointment as 2022 President's Professor at ASU (see above for more details).

- **Undergraduate Research:** I currently have two outstanding undergraduate students working on my research in self-organizing particle systems, continuing a strong line of supervising undergraduate research.

- **Enhance diversity in STEM at ASU** through my six NSF funded educational undergraduate Computer Science, Engineering, and Mathematics Scholarship (CSEMS) and Science, Technology, Engineering and Mathematics (STEM) programs at ASU.

- **Entrepreneurial activities and innovation in underwater optical ad-hoc sensor networks:** In collaboration with Prof. Cody Youngbull, SESE, ASU, we have made it viable to use lightwave wireless sensor devices for muti-hop underwater communication, which poses many new and interesting challenges in point-to-point and multi-hop network algorithm design: We have a *provisional patent application* on multi-hop routing algorithms developed for such domains. This work has immediate practical applications and hence, in partnership with MacArtney Underwater Technology Group, we started *UON technologies*, a company created to address the needs of several underwater applications that can benefit from the type of lightwave sensor networks we developed. http://www.uontechnologies.com/

- **A data mule network focused on Amazon riverine population with e-health applications (CoDPON):** Research collaboration with Profs. Alon Efrat and Thienne Johnson, U. of Arizona, USA, and Prof. Mauro Margalho, U. da Amazonia, Brazil, with potential support from Samsung and Google Latin America, in partnership with the hospital Santa Casa de Belem and other medical doctors in the area. CoDPON networks are a specific DTN/Data Mule system inspired on air traffic control systems that aims to provide technological inclusion in areas lacking any communication infrastructure. The focus are

Amazon scenarios where the fluvial mesh is the unique means of access to the riverine communities. http://www.margalho.pro.br/codpon/

- **International Collaboration with several of the top institutions in Computer Science in Germany**, namely with University of Paderborn, Technical U. of Berlin, Technical U. of Munich, Hamburg University, and the Telekom Labs. More recently my participation as International Collaborator My international collaboration with Prof. Christian Scheideler, now at the U. of Paderborn, and Dr. Stefan Schmid at the Technical U. of Berlin and Telekom Labs has not only resulted in high impact research publications, but is also an integral component in my NSF funded "Theory of Self-stabilizing Overlay Networks", "Adversarial Models for Wireless Communication", and "Self-organizing Particle Systems" grants (Prof. Scheideler independently submits counterpart proposal to the German DFG in order to fund his part of the research). I am a potential graduate mentor for students in the international graduate school under planning at the U. of Paderborn, Germany.