Christopher Rose

Professor of Engineering | Brown University

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RESEARCH PROGRAM

Communication and information theory as a general intellectual framework. The current work — **"It From Channel"** — treats physical interaction as a communication channel and asks which forces, fields, and conservation laws can be recovered as consequences of information flow rather than assumed as primitives. Continuing threads: molecular and biological communication, morphogenesis, molecular informatics, fundamental limits of communication with matter, and information-theoretic structure in supersymmetry (Adinkras).

EDUCATION

1985	Ph.D., Electrical Engineering and Computer Science, M.I.T.
1981	S.M., Electrical Engineering and Computer Science, M.I.T.
1979	B.S., Electrical Engineering and Computer Science, M.I.T.

ACADEMIC AND PROFESSIONAL APPOINTMENTS

2015–	**Brown University** — Professor of Engineering. *Director, STEMJazz Programs* (2023–2026); *Associate Provost for STEM Initiatives* (2020–2023); *Associate Dean of the Faculty for Special Initiatives* (2015–2020); *Visiting Professor of Engineering* (2014–2015).
2013–2014	**M.I.T.** — Martin Luther King, Jr. Visiting Professor, Electrical Engineering and Computer Science.
1990–2015	**Rutgers University** — Professor of Electrical and Computer Engineering (2003–2015); Associate Professor (1996–2003); Assistant Professor (1990–1996). *Associate Director, WINLAB* (1999–2007).
1985–1990	**AT&T Bell Laboratories** — Member of Technical Staff, Network Systems Research Department.

HONORS AND RECOGNITION

2025	Brown University Tau Beta Pi Dedicated Faculty Award
2025	Karen T. Romer Award for Undergraduate Advising and Mentoring
2022	IEEE Undergraduate Teaching Award
2015–2016	Brown ONYX Society Award for Service and Dedication to Black Students
2007	**IEEE Fellow**, for contributions to wireless communication systems theory
2003	**IEEE Marconi Prize Paper Award** in Wireless Communications
2005–2013	Rutgers Engineering Governing Council teaching awards (five Teaching Excellence Awards; Best Teacher in Engineering, 2010–2011)
1997–2001	ACM SIGMOBILE Outstanding Service — Executive Committee (1997–2001) and General Chair, MobiCom 2001
1990	Henry Rutgers Research Fellow

1979–1985 Bell Laboratories Cooperative Research Fellowship
(NSF and GEM Fellowships also awarded 1979, declined)

SELECTED IMPACT

***Nature* cover story (2004).** *Inscribed Matter As An Efficient Means of Communication with An Extraterrestrial Civilization* (with G. Wright) showed that for interstellar messaging, physically inscribed matter can beat radiated signalling on energy per bit. Coverage included *The New York Times* (news and a subsequent editorial), a *Star Ledger* front page, and radio interviews on the BBC, NPR, and CBC. Adopted in Stephen Webb's *If the Universe Is Teeming with Aliens… Where Is Everybody?* (Springer, 2015) as reason #35 among the top 75 explanations for the absence of evidence of extraterrestrial intelligence. Full press archive: brown.edu/worldofbits/cosmic.

IEEE Marconi Prize Paper Award (2003). For *Wireless Systems and Interference Avoidance* (with S. Ulukus and R. Yates), which established interference avoidance as a distributed codeword-adaptation framework for multiuser wireless systems.

The HistoryMakers. Selected as an interviewee for the national African American video oral history archive. Recorded May 2026; release expected late 2027.

EDITORIAL, ADVISORY, AND POLICY SERVICE

2026– **Editor**, *Proceedings of the National Academy of Sciences*

2023–2026 Editorial Board, *Entropy*

2016–2022 **Senior Editor**, *IEEE Journal on Selected Areas in Communications*. Shepherded special issues on edge-based wireless technologies against communicable disease (2021–22), integrated sensing and communication (2020–21), reconfigurable intelligent surfaces (2019–20), human-in-the-loop mobile networks (2017), and localization awareness (2015).

2014– Steering Committee and founding Editor, *IEEE Journal on Molecular, Biological, and Multi-Scale Communications* series

2012–2014 **Member, Army Science Board** (policy advisement)

2002 **FCC Technological Advisory Council II** — briefing on interference avoidance, infostations, and spectrum economics

1999, 2003 International Visiting Committee, Portuguese Foundation for Science and Technology — nationwide engineering program assessment

– Earlier editorial appointments: *IEEE Transactions on Vehicular Technology*; *ACM Wireless Networks*; *Elsevier Pervasive and Mobile Computing*; guest editor, *ACM MONET* (1996) and *ACM WINET* (1999).

– Review panels: National Science Foundation; NRI/Ford Foundation Fellowship Selection Committee. New Jersey Commission on Science and Technology, Scientific Fields Committee Advisory Group.

RESEARCH SUPPORT

Approximately $14.5M in total awarded project budgets as principal or co-principal investigator.

$4.2M **DARPA Molecular Informatics** W911NF-18-2-0031, *Chemical CPUs: Chemical Computational Processing via Ugi Reactions*, 2017–2020. PIs: B. Rubenstein, J. Rosenstein; co-PIs: E. Kim, S. Reda, **C. Rose**, J. Sello, P. Weber.

$1.5M NSF DMR-2027108, *SemiSynBio-II: Hybrid Biofilm Semiconductor Information Systems*. PI: J. Rosenstein; co-PIs: S. Reda, **C. Rose**, B. Rubenstein.

$1.25M New Jersey Commission on Science and Technology, *New Jersey Center for Wireless Technology* (99-2042-007-17). PIs: N. Mandayam, **C. Rose**, R. Yates.

$1.2M NSF CNS-0434854, *NeTS-ProWiN: High Performance Cognitive Radio Platform*. PI: B.D. Ackland; co-PIs: M.L. Bushnell, D. Raychaudhuri, **C. Rose**, T. Sizer.

$886K NSF CCR-0205362, *ITR Collaborative Research: Achieving Innovative and Reliable Services in Unlicensed Spectrum*. PI: R. Yates; co-PIs: N. Mandayam, **C. Rose**, D. Raychaudhuri, P. Spasojevic.

$857K NSF CCR-0085986, *ITR Collaborative Research: 'Free' Bits — The Challenge of the Wireless Internet*. PI: R. Yates; co-PIs: N. Mandayam, **C. Rose**.

$740K **NSF CDI-0835592**, *CDI Type I: A Communications Theory Approach to Morphogenesis and Architecture Maintenance*. **PI: C. Rose**; co-PI: I.S. Mian (LBNL).

$670K NSF CNS-0435370, *NeTS-ProWiN: Cognitive Radios for Open Access to Spectrum*. PI: N. Mandayam; co-PIs: **C. Rose**, P. Spasojevic, R.D. Yates.

$650K DARPA Spectrum Challenge, 2012–2014. PI: W. Trappe; co-PIs: **C. Rose**, I. Seskar.

$573K DARPA SEEDLING HR00111720048, *Intelligent Chemical Sensor Networks*, 2017–2018. PI: J. Rosenstein; co-PI: **C. Rose**.

$470K NSF NCRI-9506505, *Power Control and Packet Radio Networks*, 1996–1999. PI: R. Yates; co-PI: **C. Rose**.

$430K **NSF CCR-9973012**, *Interference Avoidance in Wireless Systems*. **PI: C. Rose**; co-PI: R.D. Yates.

$412K **NSF NCRI-9206148**, *Searching for Good Call Admission Policies in Telecommunications Networks*, 1992–1995. **PI: C. Rose**; co-PI: R. Yates.

$300K NSF CCF-1941344, *EAGER: Synthetic Chemical-Based Information Processing*. PI: S. Reda; co-PIs: E. Kim, **C. Rose**, J. Rosenstein, B. Rubenstein.

$170K NSF NCR-9729863, *Parallel Computing for Wireless Networking Research*. PI: D.J. Goodman; co-PIs: N.B. Mandayam, A.T. Ogielski, **C. Rose**, R.D. Yates.

$99K **NSF CCF-0703708**, *SGER: Communications Theory and Multicellular Biology*. **PI: C. Rose**; co-PI: I.S. Mian (LBNL).

$50K NSF CNS-0716400, *TRIESTE: A Trusted Radio Infrastructure for Enforcing Spectrum Etiquettes*. PI: W. Trappe; co-PIs: **C. Rose**, Y. Zhang.

$50K Brown University Seed Award, *Communication Theory for Chemical Sensing Networks*, 2017. PI: J. Rosenstein; co-PI: **C. Rose**.

$20K National Academy of Sciences Keck Futures Initiative, *Agent-Based Modeling of Functional Behavior Selection in the Mouse*, 2010–2011. PI: S. Bonasera (UNMC); co-PIs: **C. Rose**, S. Mian (LBNL).

BOOKS AND PATENTS

Book

1. **Interference Avoidance Methods for Wireless Systems**, D. Popescu and **C. Rose**, Kluwer Academic Publishers, 2004. doi:10.1007/b105850

U.S. Patents — two inventions, five granted patents (assignee: Brown University)

1. *Multi-Parametric Machine Olfaction*, J.K. Rosenstein and **C. Rose**. U.S. Patents **12,699,079** (issued August 4, 2026), **11,828,742** (November 28, 2023), and **11,592,427** (February 28, 2023; priority to provisional 62/739,728, October 1, 2018). The "TruffleBot," developed under DARPA agreement HR00111720048.
2. *Methods of Chemical Computation*, B. Rubenstein, J.K. Rosenstein, C. Arcadia, S.L. Chen, A.D. Dombroski, J.D. Geiser, E. Kennedy, E. Kim, K.M. Oakley, S. Reda, **C. Rose**, J.K. Sello, H. Tann, and P.M. Weber. U.S. Patents **11,790,280** (issued October 17, 2023) and **11,093,865** (August 17, 2021; filed as PCT/US2019/038301). Developed under DARPA Molecular Informatics agreement W911NF-18-2-0031.

JOURNAL ARTICLES AND BOOK CHAPTERS

Grouped by theme; reverse chronological within each group.

I. Fundamental Limits of Physical and Molecular Communication

1. *Limits of Information Flow Between Classically Interacting Particles*, M. Miller-Dickson and **C. Rose**, **Physical Review E** 113(3), March 19, 2026. doi:10.1103/xb2l-78n3
2. *Capacities and Optimal Input Distributions for Particle-Intensity Channels*, N. Farsad, W. Chuang, A. Goldsmith, C. Komninakis, M. Medard, **C. Rose**, L. Vandenberghe, E. Wesel, and R. Wesel, IEEE Journal on Molecular, Biological and Multiscale Communications 6(3), pp. 220–232, December 2020. doi:10.1109/TMBMC.2020.3035371
3. *Capacity Bounds on Point-to-Point Communication Using Molecules*, **C. Rose**, I.S. Mian, and M. Ozmen, **Proceedings of the IEEE**, July 2019. doi:10.1109/JPROC.2019.2909503
4. *Inscribed Matter Communication: Part I*, **C. Rose** and I.S. Mian, IEEE Journal on Molecular, Biological and Multiscale Communications 2(2), pp. 209–227, December 2016. doi:10.1109/TMBMC.2017.2655025
5. *Inscribed Matter Communication: Part II*, **C. Rose** and I.S. Mian, IEEE Journal on Molecular, Biological and Multiscale Communications 2(2), pp. 228–239, December 2016. doi:10.1109/TMBMC.2017.2655026
6. *Inscribed Matter As An Efficient Means of Communication with An Extraterrestrial Civilization*, **C. Rose** and G. Wright, **Nature** 431, pp. 47–49, September 2, 2004. doi:10.1038/nature02884

II. Molecular Informatics, Chemical Computing, and Biological Systems

1. *Heterogeneity In Susceptibility Dictates The Order Of Epidemic Models*, **C. Rose**, A.J. Medford, C.F. Goldsmith, T. Vegge, J.S. Weitz, and A.A. Peterson, Journal of Theoretical Biology 528, November 7, 2021. doi:10.1016/j.jtbi.2021.110839
2. *Secret Messaging with Endogenous Chemistry*, E. Kennedy, J. Geiser, C. Arcadia, P. Weber, **C. Rose**, B. Rubenstein, and J. Rosenstein, Nature Scientific Reports 11(13960), July 6, 2021. doi:10.1038/s41598-021-92987-2
3. *Implementing Parallel Arithmetic via Acetylation and Its Application to Chemical Image Processing*, A. Dombroski, K. Oakley, C. Arcadia, F. Nouraei, S.L. Chen, B. Rubenstein, **C. Rose**, J. Rosenstein, S. Reda, and E. Kim, Proceedings of the Royal Society A 477(2248), April 28, 2021. doi:10.1098/rspa.2020.0899
4. *Leveraging Autocatalytic Reactions for Chemical Domain Image Classification*, C. Arcadia, A. Dombroski, K. Oakley, S. Chen, H. Tann, **C. Rose**, E. Kim, S. Reda, B. Rubenstein, and J. Rosenstein, Chemical Science 12(15), pp. 5464–5472, March 2021. doi:10.1039/D0SC05860B
5. *High-Dimensional Time Series Feature Extraction for Low-Cost Machine Olfaction*, P. Shakya, E. Kennedy, **C. Rose**, and J.K. Rosenstein, IEEE Sensors Journal, September 2020. doi:10.1109/JSEN.2020.3022966
6. *Principles of Information Storage in Small Molecules*, J.K. Rosenstein, **C. Rose**, S. Reda, P.M. Weber,

E. Kim, J. Sello, J. Geiser, E. Kennedy, C. Arcadia, A. Dombroski, K. Oakley, S.L. Chen, H. Tann, and B.M. Rubenstein, IEEE Transactions on NanoBioscience, February 28, 2020. doi:10.1109/TNB.2020.2977304

7. *Multicomponent Molecular Memory*, C. Arcadia, E. Kennedy, J. Geiser, A. Dombroski, K. Oakley, S.-L. Chen, L. Sprague, M. Ozmen, J. Sello, P. Weber, S. Reda, **C. Rose**, E. Kim, B. Rubenstein, and J.K. Rosenstein, **Nature Communications** 11(691), February 4, 2020. doi:10.1038/s41467-020-14455-1
8. *Encoding Information in Synthetic Metabolomes*, E. Kennedy, C. Arcadia, J. Geiser, P.M. Weber, **C. Rose**, B.M. Rubenstein, and J. Rosenstein, PLOS One, July 3, 2019. doi:10.1101/627745
9. *High Speed Chemical Vapor Communication Using Photoionization Detectors in Turbulent Flow*, M. Ozmen, E. Kennedy, J. Rose, P. Shakya, J.K. Rosenstein, and **C. Rose**, IEEE Journal on Molecular, Biological and Multiscale Communications, September 2018. doi:10.1109/TMBMC.2019.2926722
10. *Spatiotemporal Information Preservation In Turbulent Vapor Plumes*, E. Kennedy, P. Shakya, M. Ozmen, **C. Rose**, and J.K. Rosenstein, Applied Physics Letters 112(26), June 26, 2018. doi:10.1063/1.5037710
11. *Correlated Transmission and Detection of Concentration-Modulated Chemical Vapor Plumes*, P. Shakya, E. Kennedy, **C. Rose**, and J.K. Rosenstein, IEEE Sensors Journal 18(16), pp. 6504–6509, June 2018.
12. *Communication Theory and Multicellular Biology*, I.S. Mian and **C. Rose**, Integrative Biology 3(4), pp. 350–367, April 2011. doi:10.1039/C0IB00117A

III. Wireless Systems, Interference Avoidance, and Multiuser Communication

1. *Interference Avoidance for CDMA Systems*, D. Popescu, S. Ulukus, **C. Rose**, and R. Yates, in **Advances in Multiuser Detection** (M.L. Honig, ed.), Chapter 7, pp. 365–416, Wiley, 2009. doi:10.1002/9780470473818
2. *Interference Avoidance and Multiaccess Vector Channels*, D. Popescu, O. Popescu, and **C. Rose**, IEEE Transactions on Communications 55(8), pp. 1466–1471, August 2007. doi:10.1109/TCOMM.2007.902528
3. *Simultaneous Water Filling in Mutually Interfering Systems*, O. Popescu, D. Popescu, and **C. Rose**, IEEE Transactions on Wireless Communications 6(3), pp. 1102–1113, March 2007. doi:10.1109/TWC.2007.05464
4. *Codeword Optimization for Uplink CDMA Dispersive Channels*, D. Popescu and **C. Rose**, IEEE Transactions on Wireless Communications 4(4), pp. 1563–1574, July 2005. doi:10.1109/TWC.2005.850351
5. *Greedy SINR Maximization in Collaborative Multi-Base Wireless Systems*, O. Popescu and **C. Rose**, EURASIP Journal on Wireless Communications and Networking (2), pp. 201–209, 2004. doi:10.1155/S1687147204406082
6. *Sum Capacity and TSC Bounds in Collaborative Multi-Base Wireless Systems*, O. Popescu and **C. Rose**, IEEE Transactions on Information Theory 50(10), pp. 2433–2438, October 2004. doi:10.1109/TIT.2004.834851
7. *Maximizing the Determinant for a Special Class of Block-Partitioned Matrices*, O. Popescu, **C. Rose**, and D. Popescu, Mathematical Problems in Engineering 2004(1), pp. 49–61, 2004. doi:10.1155/S1024123X04307027
8. *Interference Avoidance and Multiuser MIMO Systems*, D. Popescu and **C. Rose**, International Journal of Satellite Communications 21(1), pp. 143–161, January 2003.
9. *Wireless Systems and Interference Avoidance*, **C. Rose**, S. Ulukus, and R. Yates, IEEE Transactions on Wireless Communications 1(3), pp. 415–428, July 2002. **2003 IEEE Marconi Prize Paper Award** doi:10.1109/TWC.2002.800540
10. *CDMA Codeword Optimization: Interference Avoidance and Convergence via Class Warfare*, **C. Rose**, IEEE Transactions on Information Theory 47(6), pp. 2368–2382, September 2001. doi:10.1109/18.945252
11. *Interference Avoidance*, D. Popescu and **C. Rose**, Wiley Encyclopedia of Telecommunications (J. Proakis, ed.), Wiley, 2002. doi:10.1002/0471219282.eot272

IV. Mobility Management, Networks, and Resource Allocation

1. *Coping with Uncertainty in Mobile Wireless Networks*, S.K. Das and **C. Rose**, in **Emerging Location Aware Broadband Wireless Ad Hoc Networks** (R. Ganesh, S. Kota, K. Pahlavan, and R. Augusti, eds.), Chapter 12, pp. 189–204, Springer, 2005. doi:10.1007/0-387-23072-6_12
2. *Paging and Registration in Mobile Networks*, **C. Rose**, Wiley Encyclopedia of Telecommunications (J. Proakis, ed.), Wiley, 2002. doi:10.1002/0471219282.eot271
3. *Infostations: New Perspectives On Wireless Data Networks*, **C. Rose**, in **Next Generation Wireless Networks** (S. Tekinay, ed.), Kluwer Academic Publishers, May 2000. doi:10.1007/0-306-47310-0_2
4. *One Dimensional Location Area Design*, C.U. Saraydar, O.E. Kelly, and **C. Rose**, IEEE Transactions on Vehicular Technology 49(5), pp. 1626–1632, September 2000. doi:10.1109/25.892546
5. *State-Based Paging/Registration: A Greedy Approach*, **C. Rose**, IEEE Transactions on Vehicular Technology 48(1), pp. 166–173, January 1999. doi:10.1109/25.740083
6. *Highly Mobile Users and Paging: Optimal Polling Strategies*, A. Yener and **C. Rose**, IEEE Transactions on Vehicular Technology 47(4), pp. 1251–1257, November 1998. doi:10.1109/25.728514
7. *Location Uncertainty in Mobile Networks: A Theoretical Framework*, **C. Rose** and R. Yates, IEEE Communications Magazine 35(2), pp. 94–101, February 1997.
8. *Ensemble Polling Strategies for Increased Paging Capacity in Mobile Communication Networks*, **C. Rose** and R. Yates, ACM Wireless Networks 3(2), pp. 159–167, 1997. doi:10.1023/A:1019196931796
9. *Genetic Algorithms Applied to the Cellular Call Admission Problem: Local Policies*, A. Yener and **C. Rose**, IEEE Transactions on Vehicular Technology 46(1), February 1997. doi:10.1109/25.554739
10. *Analysis of a Mobile Assisted Adaptive Location Management Strategy*, R. Yates, **C. Rose**, S. Rajagopalan, and B. Badrinath, ACM Mobile Networks and Applications (MONET) 1(2), pp. 105–112, 1996. doi:10.1007/BF01193331
11. *Minimizing the Average Cost of Paging and Registration: A Timer-Based Method*, **C. Rose**, ACM Wireless Networks 2(2), pp. 109–116, June 1996. doi:10.1007/BF01225634
12. *Genetic Algorithms and Call Admission to Telecommunications Networks*, **C. Rose** and R. Yates, Computers and Operations Research 23(5), pp. 485–499, May 1996. doi:10.1016/0305-0548(95)00033-X
13. *Scheduling Arrivals to Queues for Minimum Average Blocking: The S(n)/M/C/C System*, **C. Rose** and R. Yates, Computers and Operations Research 22(8), pp. 793–806, October 1995. doi:10.1016/0305-0548(94)00068-J
14. *Minimizing the Average Cost of Paging Under Delay Constraints*, **C. Rose** and R. Yates, ACM Wireless Networks 1(2), pp. 211–219, 1995. doi:10.1007/BF01202543
15. *Mean Internodal Distance in Multihop Store and Forward Networks*, **C. Rose**, IEEE Transactions on Communications 40(8), pp. 1310–1318, 1992. doi:10.1109/26.156635
16. *Low Mean Internodal Network Topologies and Simulated Annealing*, **C. Rose**, IEEE Transactions on Communications 40(8), pp. 1319–1326, 1992. doi:10.1109/26.156636

V. Earlier Work: Switching, Neural Computation, Superconducting Structures, and Auditory Neuroscience

1. *High T_c Superconductor Waveguides: Theory and Application*, J.H. Winters and **C. Rose**, IEEE Transactions on Microwave Theory and Techniques 39(4), pp. 617–623, 1991. doi:10.1109/22.76423
2. *A Dielectric-Free Superconducting Coaxial Cable*, **C. Rose** and M.J. Gans, IEEE Transactions on Microwave Theory and Techniques 38(2), pp. 166–177, 1990. doi:10.1109/22.46427
3. *Rapid Optimal Scheduling for Time-Multiplex Switches Using a Cellular Automaton*, **C. Rose**, IEEE Transactions on Communications 37(5), pp. 500–509, 1989. doi:10.1109/26.24601

4. *Minimum Distance Automata in Parallel Networks for Optimum Classification*, J.H. Winters and **C. Rose**, Neural Networks 2, pp. 127–132, 1989. doi:10.1016/0893-6080(89)90029-4
5. *Frequency Dependence of Synchronization of Cochlear Nerve Fibers in the Alligator Lizard: Evidence for a Cochlear Origin of Timing and Non-Timing Neural Pathways*, **C. Rose** and T.F. Weiss, Hearing Research 33, pp. 151–166, 1988. doi:10.1016/0378-5955(88)90028-7
6. *Stages of Degradation of Timing Information in the Cochlea: A Comparison of Hair-Cell and Nerve-Fiber Responses in the Alligator Lizard*, T.F. Weiss and **C. Rose**, Hearing Research 33, pp. 167–174, 1988. doi:10.1016/0378-5955(88)90029-9
7. *A Comparison of Synchronization Filters in Different Auditory Receptor Organs*, T.F. Weiss and **C. Rose**, Hearing Research 33, pp. 175–179, 1988. doi:10.1016/0378-5955(88)90030-5
8. *The Performance of Random and Optimal Scheduling in a Time-Multiplex Switch*, **C. Rose** and M.G. Hluchyj, IEEE Transactions on Communications 35(8), pp. 813–817, 1987. doi:10.1109/TCOM.1987.1096868

Also: Guest Editorial, Series on Molecular, Biological, and Multiscale Communication (inaugural issue), A.W. Eckford, D. Krishnaswamy, J.L. Paluh, and **C. Rose**, IEEE Journal on Selected Areas in Communications 32(12), pp. 2313–2314, December 2014. doi:10.1109/JSAC.2014.2367751

SELECTED REFEREED CONFERENCE PUBLICATIONS

Thirty of sixty-eight refereed conference papers; full list available on request.

1. *Limits of Information Flow Between Classically Interacting Particles*, M. Miller-Dickson and **C. Rose**, International Seminar on Information and Communication, Zurich, February 2026.
2. *Hide and Seek on a Budget*, **C. Rose**, International Symposium on Information Theory (ISIT), Espoo, June 2022.
3. *A General Upper Bound on Point-to-Point Particle Timing Channel Capacity Under Constant Particle Emission Intensity*, **C. Rose** and I.S. Mian, ISIT, Paris, July 2019.
4. *Parallelized Linear Classification with Volumetric Chemical Perceptrons*, C. Arcadia, H. Tann, A. Dombroski, K. Ferguson, S.L. Chen, E. Kim, B. Rubenstein, **C. Rose**, S. Reda, and J. Rosenstein, IEEE International Conference on Rebooting Computing, 2018.
5. *TruffleBot: Low-Cost Multi-Parametric Machine Olfaction*, J. Webster, P. Shakya, E. Kennedy, M. Caplan, **C. Rose**, and J.K. Rosenstein, IEEE Biomedical Circuits and Systems Conference (BioCAS), Cleveland, October 2018.
6. *High Speed Chemical Vapor Communication Using Photoionization Detectors*, M. Ozmen, E. Kennedy, J.K. Rose, P. Shakya, J. Rosenstein, and **C. Rose**, IEEE Global Communications Conference, Abu Dhabi, December 2018.
7. *Computing With Chemicals: Perceptrons Using Mixtures of Small Molecules*, **C. Rose**, S. Reda, B. Rubenstein, and J.K. Rosenstein, ISIT, Vail, June 2018.
8. *The Particle Intensity Channel With Imperfect Transmitter and Receiver*, N. Farsad, **C. Rose**, M. Medard, and A. Goldsmith, ISIT, Aachen, June 2017.
9. *State Estimation, Wireless Tropes, Demons and Uncertainty*, **C. Rose**, ISIT, Barcelona, July 2016.
10. *A Fundamental Framework for Molecular Communication Channels: Timing and Payload*, **C. Rose** and I.S. Mian, IEEE International Conference on Communications (ICC), London, June 2015.
11. *Signaling with Identical Tokens: Upper Bounds with Energy Constraints*, **C. Rose** and I.S. Mian, ISIT, Honolulu, July 2014.
12. *Signaling with Identical Tokens: Lower Bounds with Energy Constraints*, **C. Rose** and I.S. Mian, ISIT,

Istanbul, July 2013.

13. *Wireless Signaling with Identical Quanta*, R. Song, **C. Rose**, Y.-L. Tsai, and I.S. Mian, WCNC, Paris, April 2012.
14. *An Additive Exponential Noise Channel with a Transmission Deadline*, Y.-L. Tsai, **C. Rose**, R. Song, and I.S. Mian, ISIT, St. Petersburg, July 2011, pp. 598–602.
15. *MIMO Power Strategies for Limited Transmitter CSI*, Y.-L. Tsai and **C. Rose**, Conference on Information Sciences and Systems (CISS), Princeton, March 2010.
16. *Channel Probing Under a Power Budget*, J. Singh and **C. Rose**, CISS, Princeton, March 2006.
17. *Intelligent Power Allocation Strategies for Unlicensed Spectrum*, N. Clemens and **C. Rose**, IEEE Symposium on New Frontiers in Dynamic Spectrum Access Networks (DySPAN), Baltimore, November 2005.
18. *Will ET Write or Radiate: Inscribed Mass vs. Electromagnetic Channels*, **C. Rose** and G. Wright, Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, November 2004.
19. *Optimal Signature Sets for Transmission of Correlated Data over a Multiple Access Channel*, J. Acharya, R. Roy, J. Singh, and **C. Rose**, IEEE Globecom, Dallas, November 2004.
20. *Signal Space Partitioning Versus Simultaneous Water Filling for Mutually Interfering Systems*, O. Popescu, **C. Rose**, and D.C. Popescu, IEEE Globecom, Dallas, November 2004.
21. *Exploiting Mobility in Multi-Hop Infostation Networks to Decrease Transmit Power*, F. Atay and **C. Rose**, IEEE Wireless Communications and Networking Conference (WCNC), March 2004.
22. *Codeword Adaptation and Tracking for Distributed Interference Avoidance*, J. Singh and **C. Rose**, IEEE Globecom, San Francisco, December 2003.
23. *Interference Avoidance and Multiaccess Vector Channels*, D.C. Popescu, O. Popescu, and **C. Rose**, ISIT, Lausanne, July 2002.
24. *Fading Channels and Interference Avoidance*, D.C. Popescu and **C. Rose**, 39th Allerton Conference on Communication, Control, and Computing, Monticello, October 2001.
25. *Interference Avoidance and Multiaccess Dispersive Channels*, D.C. Popescu and **C. Rose**, 35th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, November 2001.
26. *Interference Avoidance, Sum Capacity and Class Warfare*, **C. Rose**, CISS, Princeton, March 2000.
27. *Interference Avoidance and Dispersive Channels: A New Look at Multicarrier Modulation*, D. Popescu and **C. Rose**, 37th Allerton Conference on Communication, Control, and Computing, Monticello, September 1999.
28. *Optimum Power Scheduling for CDMA Access Channels*, A. Yener, **C. Rose**, and R.D. Yates, IEEE Globecom, Phoenix, November 1997, vol. 3, pp. 1499–1503.
29. *Soft Dropping Power Control*, R. Yates, S. Gupta, **C. Rose**, and S. Sohn, IEEE Vehicular Technology Conference, Phoenix, April 1997, pp. 1694–1698.
30. *Paging Cost Minimization Under Delay Constraints*, **C. Rose** and R. Yates, IEEE Infocom, Boston, April 1995, pp. 490–495.

SELECTED INVITED LECTURES, KEYNOTES, AND TUTORIALS

Selected from more than seventy invited presentations.

1. *Hide and Seek on a Budget*, Information Theory and Applications (ITA), San Diego, May 2022.
2. *Finest-Grain Molecular Communication*, NSF Workshop on Biology Through Information, Communication and Coding Theory, Alexandria, January 2020.

3. *Communicating Using Molecules*, Northeastern University ECE, Boston, October 2019.
4. *Conversations With Chemicals: Memory and Computing Without Long Oligomers*, ITA, San Diego, February 2018.
5. *What Did the Proton Say to the Electron?*, with S. Alexander, ITA, San Diego, February 2017.
6. *Die-Particle-Die vs. Wait-Receiver-Wait: Molecular Communication with Finite Symbol Intervals*, with N. Farsad, 15th Canadian Workshop on Information Theory, special track on biological information theory, Quebec City, June 2017.
7. *A Fundamental Approach to Communication Using Individual Molecules*, Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, November 2016.
8. *Fundamental Limits of Molecular Communication*, IEEE Communication Theory Workshop, Nafplio, Greece, May 2016.
9. *Write, Don't Radiate*, Breakthrough Initiatives, Stanford University, April 2016.
10. *THz Wireless, Undulating Surfaces and Disco Balls*, ITA, San Diego, February 2016. *Related: Can We Get Energy On Target in THz Wireless Networks?*, Workshop on Cognition and Control, Gainesville, January 2016; *THz Wireless: Whither Mobility and Connectivity*, Keck Symposium for Terahertz Communication and Imaging, Rice University, November 2015.
11. *The Unreasonable Efficiency of Messages in Bottles*, with G. Wright, Dartmouth Physics and Astronomy Public Lecture, November 2014.
12. *Is Reality an Error Correcting Code?*, with S.J. Gates, ITA, San Diego, February 2013.
13. *Communication Using Identical Tokens*, ITA, San Diego, February 2012.
14. *A World of Bits: Communication Theory and Multi-Element Physical Systems*, ITA, San Diego, February 2011. *Earlier version: A World of Bits? Communications Theory as a Lens on Everything*, Ozyegin University, Istanbul, October 2009.
15. *Write or Radiate*, California Institute of Technology Lunch Bunch Seminar, October 2011; University of Maryland Baltimore County CSEE Seminar, December 2011.
16. Panelist, *OZMA at 50* Workshop, Green Bank, West Virginia, September 2010.
17. Plenary Panel, IEEE Communication Theory Workshop, Cancun, May 2010.
18. **Keynote:** *Building a Community of Leaders and Laureates*, M.I.T. Inaugural Laureates and Leaders Celebration, Cambridge, February 2009.
19. NSF Workshop on Molecular Communication: Biological Communications Technology, Arlington, February 2008.
20. **Keynote:** *ET Might Write, Not Radiate*, with G. Wright, Alberta Informatics Circle of Research Excellence (iCORE) Summit, May 2006.
21. *ET Might Write, Not Radiate* (with G. Wright), also presented at the British Interplanetary Society Space Archaeology Conference, London (2006); Princeton University EE Seminar Series (2006); Lawrence Berkeley National Laboratory World Year of Physics series (2005); UT Austin (2005); UT San Antonio (2005); Telcordia Applied Research (2004); DIMACS Workshop on Theoretical Advances in Information Recording (2004); and Lucent Laboratories, Crawford Hill (2003).
22. *Interference Avoidance, Infostations and Economics*, briefing for the FCC Technology Advisory Council, Washington, D.C., September 2002.
23. *Interference Avoidance in Wireless Systems*, DIMACS Workshop on Signal Processing for Wireless Transmission, Piscataway, October 2002.
24. **Keynote:** *In Wireless Data Networks, Patience Has Its Rewards*, IEEE MWCN, Recife, Brazil, August

2001.

25. *Interference Avoidance for Hoards of Things*, NASA Glenn Research Center, October 1999.
26. *Signaling Cost and Location Uncertainty in Mobile Communications Systems: Glimmerings of a Theory . . . or Why Information Theory, the Lingua Franca of Uncertainty, Won't Help You Find Mobile Users*, Stanford University, June 1996.
27. *Wireless Communications Systems: New Research Challenges*, American Physical Society Annual Meeting, March 1994.
28. **Tutorials:** *Molecular Communication: System Models, Fundamental Limits, and Experimental Implementations*, with N. Farsad, WCNC, San Francisco, March 2017; *Wireless Communications 101 + New Paradigms*, IEEE MWCN, Recife, August 2001; *A Theoretical Tour of Wireless Communications*, Center for Discrete Mathematics, Rutgers University, July 2000.

DOCTORAL AND MASTER'S ADVISEES

Doctoral Students

2026 **Miles Miller-Dickson**, *On the Classical and Quantum Information Flow Between Interacting Particles* (Brown)

2007 **Jasvinder Singh**, *Resource Allocation in Coordinated and Uncoordinated Wireless Systems with Greedy or Non-Greedy Users* (Rutgers)

2004 **Otilia Popescu**, *Interference Avoidance for Wireless Systems with Multiple Receivers* (Rutgers)

2002 **Dimitrie Popescu**, *Interference Avoidance for Wireless Systems* (Rutgers)

2000 **Ana-Lucia Iacono**, *Information Delivery in an Infostation Network* (Rutgers)

1994 **John MacLellan**, *Methods of Resource Allocation in Cellular Networks Using An Underlying Queueing Model* (Rutgers)

Master's Students

Aaron Ray (2019, Brown); YiLin Tsai (2010); Ruochen Song (2009); Neville Clemens (2006); Furuzan Atay (2003); David Tabora (2001); Kabir Kasargod (1999); Cem Saraydar (1997); Kenyon Wells (1997); Zhuyu Lei (1996); Aylin Yener (1994) — all Rutgers unless noted.

PROFESSIONAL SERVICE

Conferences	**General Chair**, ACM MobiCom 2001, Rome. **Technical Program Committee Co-Chair**, ACM MobiCom '97, Budapest. Executive Committee, ACM SIGMOBILE (1997–2000); Steering Committee, ACM MobiCom and ACM SIGMOBILE WoWMoM.
Workshops	Co-Chair: NSF Workshop on Biologically-Enabled Wireless Networks, molecular computing track (2011); Berkeley/WINLAB Focus 2000 on PicoRadio Networks; WINLAB/Berkeley Focus '99 on Radio Networks for Everything; WINLAB Focus '98 on the U-NII. Organizer: WINLAB Workshop on Unlicensed Spectrum (2003). Co-Chair (with S. Verdu), DIMACS Focus on Computational Information Theory and Coding, Rutgers Center for Discrete Mathematics, 2002–2003.
Committees	Technical program committees for roughly thirty-five conferences, 1996–2021, including IEEE Globecom, ICC, Infocom, VTC, ACM MobiCom, ACM NanoCom, and the IEEE molecular/biological/multiscale communications symposia.
Consulting	Wireless communications — industry, venture capital, and legal (expert witness).
Memberships	IEEE (Fellow, 2007); Association for Computing Machinery.

UNIVERSITY SERVICE — BROWN

2014–2026	**Chair**, Thinking Out Loud Presidential Colloquium Series (thinking-out-loud.brown.edu)
2016–2021	**Chair**, Provost's Visiting Professor Program
2016–	Member, Diversity and Inclusion Oversight Board
2015–2026	Faculty Advisor, National Society of Black Engineers (NSBE)
2020–2029	First-year advisor, Classes of 2020 through 2029 (approximately fifty advisees); Meiklejohn co-advisor
2015–2022	Search committees: Dean of Engineering (2021); Vice President and Associate Vice President for Institutional Equity and Diversity (2017, 2021, 2022); Dean of the College (2018) and Deputy Dean (2022); Dean of Admissions (2016); School of Engineering Photonics (2017–18); SoE Research Administration (2016); Catalyst Program Director (2015)
2016	Instructor, *Some Life Stories of Current Successful Historically Underrepresented Scientists and Engineers* (independent study); Parents' Weekend faculty speaker

August 2026. A complete vita, including all sixty-eight refereed conference papers, the full invited-talk record, and thirty-six WINLAB technical reports, is available on request.