

Parimal Parag

CONTACT INFORMATION	Indian Institute of Science ECE main building, Room 2.17 Bangalore, KA 560012, India	+91 (80) 2293-2279 parimal@iisc.ac.in www.ece.iisc.ac.in/~parimal
RESEARCH INTERESTS	Modeling, analysis, and control of large-scale distributed networked systems	
EDUCATION	Ph.D., Texas A&M University, College Station 07/2004-12/2011 Department of Electrical and Computer Engineering <ul style="list-style-type: none">◇ Dissertation: <i>"Delay-sensitive communications: code-rates, strategies, and distributed control"</i>◇ Advisors: Jean-François Chamberland & Srinivas Shakkottai	
	M. Tech., Indian Institute of Technology Madras 07/1999-07/2004 Electrical Engineering, Communication Systems <ul style="list-style-type: none">◇ Dissertation: <i>"Subcarrier allocation for multi-user OFDMA systems"</i>◇ Advisors: R. Aravind & Srikrishna Bhashyam	
	B. Tech., Indian Institute of Technology Madras 07/1999-07/2004 Electrical Engineering	
ACADEMIC EXPERIENCE	Associate Professor, Indian Institute of Science 12/2020 - present Department of Electrical Communication Engineering	
	Assistant Professor, Indian Institute of Science 12/2014 - 11/2020 Department of Electrical Communication Engineering	
	Visiting Student Researcher, Stanford University 09/2010 - 12/2010 Management Science & Engineering	
	Summer Intern, Los Alamos National Lab 05/2007 - 08/2007 Computer, Computational and Statistical Sciences	
	Research Assistant, Texas A&M University 01/2005-07/2011 Department of Electrical and Computer Engineering	
INDUSTRIAL EXPERIENCE	Senior Systems Engineer, ASSIA Inc. 09/2011-11/2014 Expresse Research and Development Conducted research on anomaly detection in broadband networks	
FUNDED PROJECTS	<ul style="list-style-type: none">◇ Vehicle to infrastructure communications over 5G testbed, Department of Telecommunications (DoT), 2018.◇ Design and analysis of distributed storage networks, Science and engineering research board (SERB), 2017.	

HONORS & AWARDS

- ◇ Control and management of highly mobile tactical ad hoc networks, Defence research and development organization (DRDO), 2014.
- ◇ Co-author of student best paper award at IEEE International Symposium on Information Theory (ISIT), 2018.
- ◇ Early career research award, Science and engineering research board (SERB), Department of Science and Technology, India, 2017.
- ◇ Graduate fellowship, Texas A&M University, 2004.
- ◇ Silver medal, Electrical Engineering department, IIT Madras, 2003.
- ◇ All India rank 7 in ECE stream in Graduate Aptitude Test in Engineering (GATE), 2002.
- ◇ Final-round participant in Indian National Mathematical Olympiad, 1996.
- ◇ Indian National Talent Search scholarship, 1996.

PUBLICATIONS

Book Chapters and Theses

- [B1]** P. Parag. *Delay-sensitive communications: code-Rates, strategies, and distributed control*. PhD thesis, Texas A&M University, College Station, TX, USA, July 2011.

Peer-Reviewed Journal Papers

Published/Accepted

- [J14]** S. C. Bobbili, S. Bhambay, and P. Parag. Variable length differential encoding for real-time status updates. *IEEE Communication Letters*.
- [J13]** S. C. Bobbili, P. Parag, and J.-F. Chamberland. Real-time status updates with perfect feedback over erasure channels. *IEEE Transactions on Communications*, 68(9):5363–5374, Sep 2020.
- [J12]** R. Bitar, P. Parag, and S. El Rouayheb. Minimizing latency for secure coded computing using secret sharing via staircase codes. *IEEE Transactions on Communications*, 68(8):4609–4619, Aug 2020.
- [J11]** P. Mayekar, P. Parag, and H. Tyagi. Optimal lossless source codes for timely updates. *IEEE Transactions on Information Theory*, 66(6):3714–3731, Jun 2020.
- [J10]** A. Badita, P. Parag, and V. Aggarwal. Optimal server selection for straggler mitigation. *IEEE/ACM Transactions on Networking*, 28(2):709–721, Apr 2020.
- [J09]** S. Poojary, S. Bhambay, and P. Parag. Real-time status updates for Markov source. *IEEE Transactions on Information Theory*, 65(9):5737–5749, Sep 2019.

- [J08] A. Badita, P. Parag, and J.-F. Chamberland. Latency analysis for distributed coded storage systems. *IEEE Transactions on Information Theory*, 65(8):4683–4698, Aug 2019.
- [J07] A. Heidarzadeh, J.-F. Chamberland, R. D. Wesel, and P. Parag. A systematic approach to incremental redundancy with application to erasure channels. *IEEE Transactions on Communications*, 67(4):2620–2631, Apr 2019.
- [J06] S. Bhambay, S. Poojary, and P. Parag. Fixed length differential encoding for real-time status updates. *IEEE Transactions on Communications*, 67(3):2381–2392, Mar 2019.
- [J05] P. Parag, J.-F. Chamberland, H. D. Pfister, and K. R. Narayanan. Code rate, queueing behavior and the correlated erasure channel. *IEEE Transactions on Information Theory*, 59(1):397–407, Jan 2013.
- [J04] P. Parag, S. Sah, S. Shakkottai, and J.-F. Chamberland. Value-aware resource allocation for service guarantees in networks. *IEEE Journal on Selected Areas in Communications*, 29(5):960–968, May 2011.
- [J03] P. Parag and J.-F. Chamberland. Queueing analysis of a butterfly network for comparing network coding to classical routing. *IEEE Transactions on Information Theory*, 56(4):1890–1908, Apr 2010.
- [J02] L. Liu, P. Parag, and J.-F. Chamberland. Quality of service analysis for user cooperation in wireless communication systems using fluid models. *IEEE Transactions on Information Theory*, 53(10):3833–3842, Oct 2007.
- [J01] L. Liu, P. Parag, J. Tang, W.-Y. Chen, and J.-F. Chamberland. Resource allocation and quality of service evaluation for wireless communication systems using fluid models. *IEEE Transactions on Information Theory*, 53(5):1767–1777, May 2007.

Peer-Reviewed Conference Papers

Published/Accepted

- [C26] P. Parag, P. Patil, S. Shriram, R. Sundaresan, H. Tyagi, N. K. Vaidhiyan. “Antidote” for CoVID-19 pandemic induced surge in online learning. *ACM SIGCOMM Education Workshop*, Jul 2020.
- [C25] R. Jinan, P. Parag, and H. Tyagi. Tracking an auto-regressive process with limited communication. *IEEE International Symposium on Information Theory (ISIT)*, Los Angeles, CA, USA, Jun 21-26, 2020.
- [C24] A. Krishnan K.S., C. Singh, S. T. Maguluri, and P. Parag. Optimal pricing in finite server systems. *International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt)*, Volos, Greece, Jun 15-19, 2020.

- [C23] S. K. Hanna, R. Bitar, P. Parag, V. Dasari, and S. E. Rouayheb. Adaptive distributed stochastic gradient descent for minimizing delay in the presence of stragglers. *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Barcelona, Spain, May 04-08, 2020.
- [C22] A. Badita, P. Parag, and V. Aggarwal. Sequential addition of coded tasks for straggler mitigation. *IEEE International Conference on Computer Communications (INFOCOM)*, Beijing, China, Apr 27-30, 2020.
- [C21] P. Sharma, D. Awasare, B. Jaiswal, S. Mohan, N. Abhinaya, I. S. Darwhekar, S. V. R. Anand, B. Amrutur, A. Gopalan, P. Parag, and H. Tyagi. On the latency in vehicular control using video streaming over Wi-Fi. *National Conference on Communications (NCC)*, IIT Kharagpur, India, Feb 21-23, 2020.
- [C20] S. Acharya, B. Amrutur, Y. Simmhan, A. Gopalan, P. Parag, and H. Tyagi. CORNET: A co-simulation middleware for robot networks. *International Conference on Communication Systems & Networks (COMSNETS)*, Bangalore, India, Jan 07-11, 2020.
- [C19] A. Heidarzadeh, J.-F. Chamberland, P. Parag, and R. D. Wesel. A systematic approach to incremental redundancy over erasure channels. *IEEE International Symposium on Information Theory (ISIT)*, Vail, CO, USA, Jun 17-22, 2018.
- [C18] P. Mayekar, P. Parag, and H. Tyagi. Optimal lossless source codes for timely updates. *IEEE International Symposium on Information Theory (ISIT)*, Vail, CO, USA, Jun 17-22, 2018.
- [C17] V. R. Raja, P. Parag, and S. Shakkottai. Mode-Suppression: A simple and provably stable chunk-sharing algorithm for P2P networks. *IEEE Conference on Computer Communications (INFOCOM)*, Honolulu, HI, USA, April 15-19, 2018.
- [C16] P. Parag and J.-F. Chamberland. Novel latency bounds for distributed coded storage. *Information Theory and Applications Workshop (ITA)*, San Diego, CA, Feb 11-16, 2018.
- [C15] S. Poojary, S. Bhambay, and P. Parag. Real-Time Status Updates for Correlated Source. *IEEE Information Theory Workshop (ITW)*, Kaohsiung, Taiwan, November 6-10, 2017.
- [C14] R. Bitar, P. Parag, and S. El Rouayheb. Minimizing latency for secure distributed computing. *IEEE International Symposium on Information Theory (ISIT)*, Aachen, Germany, June 25-30, 2017.
- [C13] P. Parag, A. Bura, and J.-F. Chamberland. Latency analysis for distributed storage. *IEEE Conference on Computer Communications (INFOCOM)*, Atlanta, GA, May 1-4, 2017.
- [C12] S. Bhambay, S. Poojary, and P. Parag. Differential encoding for real-time status updates. *IEEE Wireless Communications and Networking Conference (WCNC)*, San Francisco, CA, March 19-22, 2017.

- [C11] P. Parag, A. Taghavi, and J.-F. Chamberland. On real-time status updates over symbol erasure channels. *IEEE Wireless Communications and Networking Conference (WCNC)*, San Francisco, CA, March 19-22, 2017.
- [C10] P. Parag and J.-F. Chamberland. Waiting on distributed content. *IEEE Information Theory and Applications (ITA)*, San Diego, CA, February 10-15, 2013.
- [C09] P. Parag and J.-F. Chamberland. Exploiting an interplay between norms to analyze scalar quantization schemes. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Prague, Czech Republic, May 22-25, 2011.
- [C08] P. Parag, S. Shakkottai, and I. Menache. Request routing in multi-ISP P2P content distribution: local or remote? *2nd International ICST Conference on Game Theory for Networks*, Shanghai, China, April 16-18, 2011.
- [C07] M. Amble, P. Parag, S. Shakkottai, and L. Ying. Content-aware caching and traffic management in content distribution networks. *IEEE Conference on Computer Communications (INFOCOM)*, Shanghai, China, April 10-15, 2011.
- [C06] P. Parag, J.-F. Chamberland, H. D. Pfister, and K. R. Narayanan. On the queueing behavior of random codes over a Gilbert-Elliot erasure channel. *IEEE International Symposium on Information Theory*, 1798 – 1802, Austin, TX, June 13-18, 2010.
- [C05] P. Parag, S. Shakkottai, and J.-F. Chamberland. Value-aware resource allocation for service guarantees in networks. *IEEE International Conference on Computer Communications (INFOCOM)*, 1–9, San Diego, CA, March 15-19, 2010.
- [C04] P. Parag, J.-F. Chamberland, H. D. Pfister, and K. R. Narayanan. Code rate, queueing behavior and the correlated erasure channel. *Invited Paper, IEEE Information Theory Workshop*, 1–5, Cairo, Egypt, January 6-8, 2010.
- [C03] P. Parag and J.-F. Chamberland. Queueing analysis of a butterfly network. In *IEEE International Symposium on Information Theory*, 672–676, Toronto, Canada, July 6-11, 2008.
- [C02] L. Liu, P. Parag, J. Tang, W.-Y. Chen, and J.-F. Chamberland. Resource allocation and quality of service evaluation for wireless communication systems using fluid models. *44th Allerton Conference on Communication, Control, and Computing*, 44:1187–1193, Monticello, IL, September 27-29, 2006.
- [C01] P. Parag, S. Bhashyam, and R. Aravind. A subcarrier allocation algorithm for OFDMA using buffer and channel state information. *IEEE 62nd Vehicular Technology Conference*, 62 (1):622–625, September 2005.

INVITED TALKS

- “Tracking auto-regressive process with limited communication,”
Bombay Information Theory Seminar, Jan 2020.
- “Real-time status updates for Markov sources,”
Bombay Information Theory Seminar, Jan 2018.
IIT Delhi, Jan 2017.
- “Job completion times in coded parallel systems,”
Alliance University at Bangalore, Sep 2018.
Faculty colloquium at IISc Bangalore, Jan 2018.
MVJ College of Engineering at Bangalore, Aug 2017.
Georgia Institute of Technology at Atlanta, May 2017.
Lectures in Probabilities Seminar XI at ISI Delhi, Nov 2016.
- “Latency analysis for distributed storage,”
JTG summer school at IIT Bombay, May 2017.
Texas A&M University at College Station, May 2017.
University of Illinois at Chicago, Apr 2017.
University of California at Berkeley, Mar 2017.
National Conference on Communication at IIT Madras, Mar 2017.
IBM Research, Feb 2017.

TEACHING
EXPERIENCE

Indian Institute of Science

Lecturer

- ◇ E2 204: Stochastic Processes and Queueing Theory Spring 2015-2020
- ◇ E2 202: Random Processes Fall 2017-2020
- ◇ E2 336: Topics in Computation over Networks Spring 2019
- ◇ E1 244: Estimation and Detection Theory Spring 2016-2017
- ◇ E0 201: Proofs and Measures Fall 2015

Texas A&M University

Guest Lecturer

- ◇ ECEN 303 – Random Signals and Systems Spring 2010
- ◇ ECEN 601 – Linear Network Analysis Fall 2009
- ◇ ECEN 662 – Estimation and Detection Theory Spring 2009
- ◇ ECEN 683 – Wireless Communications Fall 2008

Texas A&M University

Teaching Assistant

- ◇ ECEN 214 – Electric Circuit Theory Spring 2008
- ◇ ECEN 314 – Signals and Systems Fall 2007

Indian Institute of Technology Madras

Teaching Assistant

- ◇ EE 611 – Digital Coding & Modulation Spring 2004
- ◇ EE 320 – Principles of Communication Fall 2003

PROFESSIONAL SERVICE

Program Chair

- ◇ International Conference on Signal Processing and Communications (SP-COM): Invited sessions 2020, Publications 2018, Web 2016
- ◇ The ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc) : Posters and Demonstrations 2018, Workshops 2017
- ◇ International Conference on Communication Systems and Networks (COMSNETS): Intelligent Transportation Systems Workshop 2018
- ◇ IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS): Technical Program Committee 2016

Technical Program Committee

- ◇ Chair: ANTS 2016
- ◇ Member: WiOpt (2020), SPCOM (2020, 2018, 2016), MobiHoc (2019, 2018, 2017, 2016), NCC (2017, 2016, 2015), COMSNETS (2017, 2016, 2015), COMSNETS ITS workshop 2016, Globecomm LTE - Advanced and Beyond 4G workshop (2013, 2012)

Organizing Committee

- ◇ National Conference on Communication (NCC) 2017, 2016, International Conference on Signal Processing and Communications (SPCOM) 2020, 2018, 2016, JTG Summer School on Information Theory (JTG 2016, JTG 2015), IISc-DRDO Workshop on Mobile Ad-Hoc Networks (2015).

Reviewer

- ◇ IEEE Transactions on Information Theory, IEEE/ACM Transactions on Networking, IEEE Transactions on Parallel and Distributed Systems, IEEE Journal On Selected Areas In Communications, IEEE Transactions on Communications, IEEE Transactions on Wireless Communications
- ◇ IEEE Conference on Computer Communications (INFOCOM), International Symposium on Information Theory (ISIT), The ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt).

MEMBERSHIPS

IEEE, Information Theory Society, Communications Society, Signal Processing Society