Arpan Chattopadhyay

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Employment

- **Assistant Professor at the Electrical Engineering department, Indian Institute of Technology, Delhi;** 24^{th} **October** 2018**-present.**
- **Visiting Researcher at the Indian Statistical Institute, Kolkata;** 6^{th} **September** 2018**-**14^{th} **October** 2018**.**
  - Host: Prof. Sasthi C. Ghosh.
- **Postdoctoral Researcher at the Electrical Engineering Department, University of Southern California, Los Angeles, USA;** 1^{st} **November** 2016**-**31^{st} **August** 2018**.**
  - Host: Prof. Urbashi Mitra.
- **Postdoctoral Researcher in the group DYOGENE of INRIA, Paris, France;** 1^{st} **December** 2015**-**30^{th} **October** 2018**.**
  - Host: Prof. Bartłomiej (Bartek) Błaszczyszyn.
- **Junior Research Associate at the Electrical Communication Engineering (ECE) Department, Indian Institute of Science (IISc), Bangalore, India;** 9^{th} **June 2015-**26^{th} **November** 2015
  - Host: Prof. Anurag Kumar.

Education

- **Ph.D**
  - Ph.D from the Electrical Communication Engineering (ECE) Department, Indian Institute of Science (IISc), Bangalore (August 2010-September 2015), under the supervision of Prof. Anurag Kumar.
  - *Thesis:* "Sequential Decision Algorithms for Impromptu (or "As-You-Go") Deployment of Wireless Sensor Networks."
- **Master of Engineering (M.E.)**
  - M.E. in Telecommunication from ECE Department, Indian Institute of Science, Bangalore (2008-10).
  - CGPA **7.2/8**, first class with distinction.
  - *M.E. Project:* "Link Scheduling and Power Allocation in Multi-beam Wireless Mesh Networks," supervised by Prof. A. Chockalingam.
- **Bachelor of Engineering (B.E.)**
  - B.E. from Jadavpur University, Kolkata (2004-08) in Electronics and Telecommunication.
  - CGPA **9.14/10**, first class with honours.
- **Higher Secondary (**12^{th}**)**
  - Passed Higher Secondary Examination with 93.10% marks in 2004 from Dhaniakhali Mahamaya Vidyamandir.
  - *Board:* West Bengal Council of Higher Secondary Education.
- **Secondary (**10^{th}**)**
  - Passed Madhyamik Examination with 93.75% marks in 2002 from Somaspur Kali Kumar High School.
  - *Board:* West Bengal Board of Secondary Education.

Research Interests

- Analysis, control, resource allocation and design of wireless networks, with a special focus on applications related to internet-of-things (IoT)
- Design, security, control, and learning of intelligent cyber-physical systems (CPS)
- Networked estimation and control
- Machine learning and artificial intelligence
- Statistical signal processing

Honors

- Recipient of **Young faculty incentive award** from IIT Delhi, for the period October 2018-October 2021.
- Secured **All India Rank 1 in GATE 2008** in Electronics and Communication. GATE (Graduate Aptitude Test in Engineering) is an all India entrance examination for admission into Masters programs in Indian Institutes.
- Rank in **West Bengal Joint Entrance Examination (2004, for 12th standard students) : 11(in Engineering) and 31(in Medical)**.
- Qualified in **National Talent Search Examination (NTSE)** in the year 2002. This is an all India competitive examination for students in 10*th* standard; this award is given to approximately 1000 students from all over India.
- Secured **20th rank in Secondary Examination (2002, for 10th standard students)** conducted by West Bengal Board of Secondary Education.

Teaching and Mentoring Experiences

- July-December 2019: ELL824 (a selected topics course on Markov decision process and reinforcement learning) and Electromagnetics Lab (ELP212) at IIT Delhi.
- May-July 2019: Digital Communication (ELL411) self-study course at IIT Delhi.
- January-April 2019: Introduction to Electrical Engineering Lab (ELL100) and Computer Communication (ELL402) course at IIT Delhi.
- Served as a guest lecturer in graduate and undergraduate level probability theory and random process courses at the University of Southern California (USC) in 2017-18.
- Served as a teaching assistant in the graduate level "Random Processes" course (August-December 2012) in ECE Department, Indian Institute of Science, Bangalore.
- Mentored a few graduate students in IISc and USC at early stage of their research.

Administrative Responsibilities at IIT Delhi

- Designed two new courses on (i) Optimization, and (ii) Markov decision processs and reinforcement learning at IIT Delhi. Applied for regularizing these two courses.
- Member of the IIT Delhi proctorial team (anti-ragging team) 2019-20.
- Institute Representative in GATE 2019 and JEE 2019.
- Committee member for project evaluation in Summer Undergraduate Research Activities (SURA) 2019.
- Committee member for B. Tech and M. Tech project evaluation.
- Invigilator in minor and major examinations.
- Hosted and evaluated faculty candidates.

- Arranged talks by visitors.
- SRC member for M.S.(Research) and Ph.D students at IIT Delhi.

Other Activities

- *Journal paper reviews:* IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Transactions on Wireless Communications, IEEE Transactions on Vehicular Technology, IEEE Transactions on Communications, IEEE Wireless Communication Letters, IEEE Transactions on Cognitive Communications and Networking, IEEE Transactions on Molecular, Biological and Multi-Scale Communications, Elsevier Ad Hoc Networks, Elsevier Computer Networks, Wireless Networks (Springer).
- *Conference paper reviews:* IEEE ISIT, PIMRC, Globecom, SPCOM, ICASSP, SPAWC and Asilomar.
- TPC member in the conference COMSNETS 2020 to be held in Bangalore, India in January 2020.
- Reviewed 1 PhD thesis from another IIT.
- Volunteered for organizing conferences such as International Conference on Signal Processing and Communication (SPCOM) and National Conference on Communication (NCC) during PhD.
- Volunteered in organizing IISc Electrical Divisional Symposium.

Talks

- JTG Summer School 2019, IIT Madras, Chennai, June 2019 (Invited Talk).
- International Workshop on Emerging Trends in IoT and Machine Learning, South Asian University, Delhi, May 2019 (Invited Talk).
- Guest seminar at the Advanced Computing and Microelectronics Unit, Indian Statistical Institute, Kolkata, September 2018.
- International Symposium on Wireless Communication Systems (ISWCS), Lisbon, Portugal, August 2018.
- IEEE Global Communications Conference (Globecom), Singapore, December 2017.
- Graph Signal Processing workshop, Carnegie-Mellon University, Pittsburgh, USA, June 2017 (invited talk).
- JTG Summer School, IISc Bangalore, India, July 2015 (student session).
- IEEE International Conference on Mobile Ad hoc and Sensor Systems (MASS), Philadelphia, USA, October 2014.
- IEEE International Conference on Signal Processing and Communication (SPCOM), Bangalore, India, July 2014.
- IEEE International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt), Tsukuba, Japan, May 2013.
- IEEE International workshop on Resource Allocation and Cooperation in Wireless Networks (RAWNET, an workshop of WiOpt), Paderborn, Germany, May 2012.
- IEEE International Conference on Signal Processing and Communication (SPCOM), Bangalore, India, July 2010.

References

Available on request.

Publications

Journal Papers (Submitted/ To Be Submitted)

1. **Arpan Chattopadhyay** and Urbashi Mitra , "Dynamic sensor subset selection for centralized tracking of a stochastic process," revised version submitted to IEEE Transactions on Signal Processing.
2. **Arpan Chattopadhyay** and Urbashi Mitra , "Dynamic sensor subset selection for distributed tracking of a stochastic process," to be submitted.
3. Avinash Mohan, **Arpan Chattopadhyay** and Anurag Kumar, "Low-Delay Decentralised MAC protocols for Time-Slotted Collocated Wireless Nodes," to be submitted.

Journal Papers (Published)

1. **Arpan Chattopadhyay** and Urbashi Mitra, "Security against false data injection attack in cyber-physical systems," accepted in IEEE Transactions on Control of Network Systems.
2. Libin Liu, **Arpan Chattopadhyay** and Urbashi Mitra , "On Solving Large Scale MDPs: Exploitation of Spectral Properties and Policy Structures," in IEEE Transactions on Communications, Volume 67, No. 6, Pages 4151-4165, June 2019.
3. **Arpan Chattopadhyay**, Bartłomiej Błaszczyszyn and Eitan Altman, "Location Aware Opportunistic Bandwidth Sharing between Static and Mobile Users with Stochastic Learning in Cellular Networks," published in IEEE Transactions on Mobile Computing, Volume 18, Issue 8, Pages 1802-1815, August 2019.
4. **Arpan Chattopadhyay**, Bartłomiej Błaszczyszyn and Eitan Altman, "Two-tier cellular networks for throughput maximization of static and mobile users," published in IEEE Transactions on Wireless Communications, Volume 18, Issue 2, Pages 997-1010, February 2019.
5. **Arpan Chattopadhyay**, Avishek Ghosh and Anurag Kumar, "Asynchronous Stochastic Approximation Based Learning Algorithms for As-You-Go Deployment of a Wireless Relay Network along a Line," published in IEEE Transactions on Mobile Computing, Volume 17, No. 5, Pages 1004-1018, May 2018.
6. **Arpan Chattopadhyay**, Bartłomiej Błaszczyszyn and H. Paul Keeler, "Gibbsian On-Line Distributed Content Caching Strategy for Cellular Networks," published in IEEE Transactions on Wireless Communications, Volume 17, No. 2, Pages 969-981, February 2018.
7. Avishek Ghosh, **Arpan Chattopadhyay**, Anish Arora and Anurag Kumar, "Measurement Based As-You-Go Deployment of Two-Connected Wireless Relay Networks," published in ACM Transactions on Sensor Networks, Volume 13, Issue 3, Article 23, September 2017.
8. **Arpan Chattopadhyay**, Abhishek Sinha, Marceau Coupechoux and Anurag Kumar, "Deploy-As-You-Go Wireless Relay Placement: An Optimal Sequential Decision Approach using the Multi-Relay Channel Model," published in IEEE Transactions on Mobile Computing, Volume 16, Issue 2, Pages 341-354, February 2017.
9. **Arpan Chattopadhyay**, Marceau Coupechoux and Anurag Kumar, "Sequential Decision Algorithms for Measurement Based Impromptu Deployment of a Wireless Relay Network along a Line," published in IEEE/ACM Transactions on Networking, Volume 24, Issue 5, Pages 2954 - 2968, October 2016.
10. Abhishek Sinha, **Arpan Chattopadhyay**, Naveen K.P., Prasenjit Mondal, Marceau Coupechoux and Anurag Kumar, "Optimal Sequential Wireless Relay Placement on a Random Lattice Path," Ad Hoc Networks Journal (Elsevier), Volume 21, Pages 1–17, October 2014.

Conference Papers

1. Moulik Choraria, **Arpan Chattopadhyay**, Urbashi Mitra and Erik Strom, "Optimal deception attack on networked vehicular cyber physical systems," accepted in the Asilomar Conference on Signals, Systems and Computers, Pacific Grove, California, USA, November 2019 (invited paper).
2. **Arpan Chattopadhyay** and Urbashi Mitra, "Active Sensing for Markov Chain Tracking," presented in the IEEE Global Conference on Signal and Information Processing (GlobalSIP), California, USA, November 2018.

3. **Arpan Chattopadhyay**, Urbashi Mitra and Erik Strom, "Secure Estimation in V2X Networks with Injection and Packet Drop Attacks," presented in the International Symposium on Wireless Communication Systems (ISWCS), Lisbon, Portugal, August 2018.
4. **Arpan Chattopadhyay** and Urbashi Mitra , "Optimal Active Sensing for Process Tracking," presented in IEEE International Symposium on Information Theory (ISIT), Colorado, USA, June 2018.
5. **Arpan Chattopadhyay** and Urbashi Mitra , "Attack Detection and Secure Estimation under False Data Injection Attack in Cyber-Physical Systems," presented in the Conference on Information Sciences and Systems (CISS), Princeton, NJ, USA, March 2018 (invited paper).
6. Libin Liu, **Arpan Chattopadhyay** and Urbashi Mitra, "Exploit Policy Structure for Solving MDP with Large State Space," presented in Conference on Information Sciences and Systems (CISS), Princeton, NJ, USA, March 2018.
7. **Arpan Chattopadhyay** and Urbashi Mitra , "Optimal Sensing and Data Estimation in a Large Sensor Network," presented in IEEE Global Communications Conference (Globecom), Singapore, December 2017.
8. Libin Liu, **Arpan Chattopadhyay** and Urbashi Mitra , "On Exploiting Spectral Properties for Solving MDP with Large State Space," presented in Annual Allerton Conference on Communication, Control, and Computing, Urbana, USA, October 2017.
9. Avinash Mohan, **Arpan Chattopadhyay** and Anurag Kumar, "Hybrid MAC Protocols for Low-delay Scheduling," presented in IEEE International Conference on Mobile Ad hoc and Sensor Systems (MASS), Brasilia, Brazil, October 2016.
10. **Arpan Chattopadhyay**, Avishek Ghosh, Akhila S. Rao, Bharat Dwivedi, S.V.R. Anand, Marceau Coupechoux, and Anurag Kumar, "Impromptu Deployment of Wireless Relay Networks: Experiences Along a Forest Trail," presented in IEEE International Conference on Mobile Ad hoc and Sensor Systems (MASS), Philadelphia, USA, October 2014.
11. Avishek Ghosh, **Arpan Chattopadhyay**, Anish Arora and Anurag Kumar, "As-You-Go Deployment of a 2-Connected Wireless Relay Network for Sensor-Sink Interconnection," presented in IEEE International Conference on Signal Processing and Communication (SPCOM), Bangalore, India, July 2014.
12. **Arpan Chattopadhyay**, Marceau Coupechoux and Anurag Kumar, "Measurement Based Impromptu Deployment of a Multi-hop Wireless Relay Network," presented in IEEE International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt), Tsukuba, Japan, May 2013.
13. **Arpan Chattopadhyay**, Abhishek Sinha, Marceau Coupechoux and Anurag Kumar, "Optimal Capacity Relay Node Placement in a Multi-hop Network on a Line," presented in IEEE International workshop on Resource Allocation and Cooperation in Wireless Networks (RAWNET, an workshop of WiOpt), Paderborn, Germany, May 2012.
14. **Arpan Chattopadhyay** and A. Chockalingam, "Past Queue Length Based Low-Overhead Link Scheduling in Multi-beam Wireless Mesh Networks," presented in IEEE International Conference on Signal Processing and Communication (SPCOM), Bangalore, India, July 2010.