

ANKUR A. KULKARNI

School Address

Systems and Control Engineering
Indian Institute of Technology Bombay
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Contact

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CURRENT POSITION

Assistant Professor

Jan 2013 – present

Systems and Control Engineering
Indian Institute of Technology Bombay
Webpage: <http://www.sc.iitb.ac.in/~ankur/>

EDUCATION

Ph.D., Industrial Engineering

Dec 2010

University of Illinois at Urbana-Champaign.
THESIS – *Generalized Nash Games with Shared Constraints: Existence, Efficiency, Refinement and Equilibrium Constraints*

M.S., General Engineering

May 2008

University of Illinois at Urbana-Champaign.
THESIS – *Topics in Stochastic Optimization and Equilibrium Problems*

B.Tech., Aerospace Engineering

May 2006

Indian Institute of Technology, Bombay.
THESIS – *Adaptive Sampling Strategies for DACE on Expensive Black-box Functions*

EXPERIENCE

Visitor

June 2014 – July 2014

Visiting Prof Karl Henrik Johansson
Department of Automatic Control, KTH Royal Institute of Technology, Stockholm, Sweden.

Post-doctoral Research Associate

Jan 2011 – Dec 2012

University of Illinois at Urbana-Champaign

Instructor

Undergraduate course: *Introduction to Operations Research* Fall '10

Undergraduate course: *Engineering Economy* Fall '11

University of Illinois at Urbana-Champaign

Visiting Scholar

May '08 – Aug '08

Visiting Prof Vivek S. Borkar
School of Technology and Computer Science, Tata Institute of Fundamental Research

Research/Teaching Assistant

Fall '06 – Spring '10

University of Illinois at Urbana-Champaign

RESEARCH INTERESTS

Game theory, optimization and variational inequalities, information and coding theory, stochastic control, operations research.

PUBLICATIONS

Journal

- Ankur A. Kulkarni and Uday V. Shanbhag, “*An Existence Result for Hierarchical Stackelberg v/s Stackelberg Games*”, to appear the IEEE Transactions on Automatic Control (2015)
- Ankur A. Kulkarni and Todd P. Coleman, “*An Optimizer’s Approach to Stochastic Control Problems with Nonclassical Information Structures*”, IEEE Transactions on Automatic Control, Vol 60, No 4, pp 937–949 (2015).
- Ankur A. Kulkarni and Uday V. Shanbhag, “*A Shared-Constraint Approach to Multi- leader Multi-follower Games*, Set Valued and Variational Analysis, 22(4), pp 691–720, 2014.
- Ankur A. Kulkarni, Negar Kiyavash and R. Sreenivas, “*On the Varshamov-Tenengolts Construction on Binary Strings*”, Vol 317, Discrete Mathematics, pp 79–90, 2014.
- Ankur A. Kulkarni and Negar Kiyavash, “*Non-asymptotic Upper Bounds for Deletion Correcting Codes*”, IEEE Transactions on Information Theory, 59(8), pp 5115–5130, 2013.
- Ankur A. Kulkarni and Uday V. Shanbhag, “*Revisiting Generalized Nash Games and Variational Inequalities*”, Journal of Optimization Theory and Applications 154(1), 2012.
- Ankur A. Kulkarni and Uday V. Shanbhag, “*On the Variational Equilibrium as a Refinement of the Generalized Nash Equilibrium*”, Automatica 48(1), pp. 45–55, 2012.
- Ankur A. Kulkarni and Uday V. Shanbhag, “*Recourse-based Stochastic Nonlinear Programming: Properties and Benders-SQP Algorithms*”, Computational Optimization and Applications (2010).
- Ankur A. Kulkarni and Vivek S. Borkar “*Finite Dimensional Approximation and Newton-based Algorithm for Stochastic Approximation in Hilbert Space*”, Automatica 45(12), pp. 2815-2822, 2009.

Conference

- Bharat Prabhakar and Ankur A. Kulkarni, “*Dimensionality Reduction of Affine Variational Inequalities Using Random Projections*” to appear in the Proceedings the Allerton Conference 2014.
- Ankur A. Kulkarni, “*Insertion and Deletion Errors with a Forbidden Symbol*” to appear in the Proceedings of the IEEE Information Theory Workshop 2014.
- Ankur A. Kulkarni and Uday V. Shanbhag, “*On the Consistency of Leaders’ Conjectures in Hierarchical Games*”, Proceedings of the IEEE Conference on Decision and Control, 2013.
- Ankur A. Kulkarni and Todd P. Coleman, “*An Optimizer’s Approach to Stochastic Control Problems with Non-classical Information Structures*”, Proceedings of the IEEE Conference on Decision and Control, 2012.
- Daniel Cullina, Ankur A. Kulkarni, and Negar Kiyavash, “*A Coloring Approach to Constructing Deletion Correcting Codes from Constant Weight Subgraphs*”, Proceedings of the IEEE International Symposium on Information Theory, 2012.
- Ankur A. Kulkarni and Uday V. Shanbhag, “*New Insights on Generalized Nash Games with Shared Constraints: Constrained and Variational Equilibria*”, Proc of the IEEE Conference on Decision and Control, 2009.
- Wei Chen, Dayu Huang, Ankur A. Kulkarni, Jayakrishnan Unnikrishnan, Quanyan Zhu, Prashant Mehta, Sean Meyn, Adam Wierman, “*Approximate Dynamic Programming using Fluid and Diffusion Approximations with Applications to Power Management*”, Proc of the IEEE Conference Decision and Control, 2009.
- Ankur A. Kulkarni, Albert Rossi, Jay Alameda and Uday V. Shanbhag, “*A Grid-Computing Framework for Quadratic Programming under Uncertainty*”, Proceedings of the TeraGrid, 2007.

UNDER REVIEW

- Bharat Prabhakar and Ankur A. Kulkarni, “*A Framework for Dimensionality Reduction and Sparsification of Linear Complementarity Problems and Affine Variational Using Random Projections*”, under review with Set-Valued and Variational Analysis.
- Mathew P. Abraham and Ankur A. Kulkarni, “*New Results on the Existence of Open Loop Nash Equilibria in Discrete Time Dynamic Games*”, under review with IEEE Transactions on Automatic Control
- Daniel Cullina, Negar Kiyavash and Ankur A. Kulkarni, “*Restricted Composition Deletion Correcting Codes*”, under review with IEEE Transactions on Information Theory.
- Bharat Prabhakar and Ankur A. Kulkarni, “*Dimensionality Reduction of Affine Variational Inequalities Using Random Projections*”, under review with Mathematical Programming.
- Wei Chen, Dayu Huang, Ankur A. Kulkarni, Jayakrishnan Unnikrishnan, Quanyan Zhu, Prashant Mehta, Sean Meyn, Adam Wierman, “*Approximate Dynamic Programming using Fluid and Diffusion Approximations with Applications to Power Management*”, under review with SIAM Journal of Control and Optimization.

AWARDS AND HONOURS

- Associate of the Indian Academy of Sciences, Bangalore (2015–2018)
- Awarded the INSPIRE Faculty Award by the Department of Science and Technology, India, 2013.
- *William A. Chittenden Award* for an Outstanding Master of Science Graduate in General Engineering.
- Listed on *The Incomplete List of Teachers Ranked as Excellent by their Students, Spring 2007*.
- Awarded the *University of Illinois Fellowship* for Summer 2010.
- *NSF Travel Grant* for the International Conference on Continuous Optimization, Hamilton, Canada, 2007.
- *IEEE CSS Student Travel Support Award* for the Conference on Decision and Control, Shanghai, China, 2009.

INVITED TALKS AND PROGRAM COMMITTEE MEMBERSHIPS

Selected invited talks

- Indo-UK workshop on Energy Management: Flexibility, Risk and Optimisation, Edinburgh, Scotland, UK, 2016
- Workshop on Analysis and Applications of Stochastic Systems (as part of SVAN 2016), Rio de Janeiro, Brazil, 2016
- TEQIP School on Systems and Control, IIT Kanpur, 2015; talk: *Game theory*
- Indo-French Summer School on Applied Mathematics, Indian Institute of Science, Bangalore, 2015; talk: *Real analysis and convex analysis*
- Joint telematics group workshop, Indian Institute of Science, Bangalore, 2015; talk: *Convex analytic approach to joint-source channel coding*
- International Conference on Signal Processing and Communication, 2014 at the Indian Institute of Science, Bangalore; talk: *On Asymmetric Insertion/Deletion Errors*.
- IBM India Research Lab, Bangalore, 2013
- Midwest Workshop on Control and Game Theory, 2012; talk: *Global Equilibria of Multi-leader Multi-follower Games with Shared Constraints*

Technical programme committee

- Member, TPC of 25th International Joint Conference on Artificial Intelligence, 2016.
- Member, TPC for National Conference on Communications, 2015, 2016.

- Member, TPC for Xerox Research Centre India Open, 2015, 2016.

OTHER PROFESSIONAL ACTIVITIES

Course development

- *Designed* and offered a course under the Quality Improvement/Continuing Education Programme, IIT Bombay on ‘Optimization and Game Theory’, 2015.
- *Designed* the popular and unique course ‘Games and Information’ at IIT Bombay. Teaching scores: 94.99 (2013), 93.91 (2014)
- *Designed* the advanced course ‘Variational Analysis and Polyhedral Geometry’ at IIT Bombay. Teaching scores: 98.67 (2014)
- *Revamped* the course ‘Optimization’ at IIT Bombay.

Session chair and organization

- Workshop on “Optimization” for the National Centre for Mathematics, 2016
- Steering committee for the National Mathematics Initiative year on Optimization and Game Theory, 2015-16.
- *Session co-chair* for sessions on “Information Theory and Control” and “Stochastic Optimal Control” at the IEEE Conference on Decision and Control, Osaka, Japan 2015.
- *Session chair* for session on “Online Optimization” at International Symposium on Mathematical Programming, Pittsburgh, USA, 2015.
- *Session chair* for session on “Coding for Distributed Storage” at SPCOM 2014.
- *Session co-chair* for session on “Optimization Theory” at the Allerton Conference, Monticello, USA 2014.
- *Organized* the Third IIT Bombay Winter School on Optimization and Control, 2014.
- *Session chair* For session on “Stochastic Programming” at the INFORMS Annual meeting, Seattle, USA 2007.

Reviewer for

- IEEE Transactions on Information Theory, Automatica, IEEE Transactions on Automatic Control, IEEE Journal on Selected Areas in Communications (*Game theory in Wireless Communications*), IEEE Transactions on Communications, Mathematical Programming, European Journal of Operations Research, Mathematical Methods of Operations Research, SIAM Journal on Optimization, IEEE Transactions on Signal Processing, Journal of Optimization Theory and Applications, Optimal Control, Applications and Methods, International Game Theory Review, Indian Journal of Pure and Applied Mathematics

Other

- Member, IEEE.
- Member of IDPC, which sets academic policies for the department.
- President of *SPICMACAY* at UIUC, 2008-2009. Managed a fully-volunteer \$20000/annum organization.

REFERENCES

- Prof Uday V. Shanbhag, Pennsylvania State University (udaybag@psu.edu)
- Prof Vivek S. Borkar, Indian Institute of Technology Bombay (borkar@ee.iitb.ac.in)
- Prof Jong-shi Pang, University of Southern California (jongship@usc.edu)
- Prof Todd P. Coleman, University of California, San Diego (tpcoleman@ucsd.edu)
- Prof Sean P. Meyn, University of Florida (meyn@ece.ufl.edu)
- Prof Tamer Başar, University of Illinois at Urbana-Champaign (basar1@illinois.edu)
- Prof P. R. Kumar, Texas A & M University (prk@tamu.edu)