

## Workshop I: High Dimensional Hamilton-Jacobi Methods in Control and Differential Games

### Monday March 30, 2020

- 8:45–9:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 9:00–9:50 **Qi Gong** (University of California, Santa Cruz (UC Santa Cruz))  
*Nonlinear optimal feedback control - a model-based learning approach*
- 10:00–10:30 *Break*
- 10:30–11:20 **Weinan E** (Princeton University)  
*High Dimensional PDEs: Theory and Numerical Algorithms*
- 11:30–12:00 *Break*
- 12:00–12:50 **Kyriakos G Vamvoudakis** (Georgia Institute of Technology)  
*Solving Game-Theoretic Hamilton-Jacobi Equations in a Model-Free Way*
- 1:00–2:00 *Lunch (on your own)*
- 2:00–2:50 **Arthur Krener** (Naval Postgraduate School)  
*Albrecht's Method in Infinite Dimensions*
- 3:00–3:30 *Break*
- 3:30–4:20 **Claire Tomlin** (University of California, Berkeley (UC Berkeley))  
*Hamilton-Jacobi Methods in Robotics*

### Tuesday March 31, 2020

- 9:00–9:50 **Helene Frankowska** (Centre National de la Recherche Scientifique (CNRS))  
*Abnormal Hamilton-Jacobi Equations arising in Infinite Horizon Problems*
- 10:00–10:30 *Break*
- 10:30–11:20 **Maurizio Falcone** (Università di Roma “La Sapienza”)  
*A discrete time Dynamic Programming approach on a tree structure for finite horizon optimal control problems*
- 11:30–12:00 *Break*

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- 12:00–12:50 **Richard Tsai** (University of Texas at Austin)  
*Learning optimal strategies for line-of-sight based games*
- 1:00–2:00 *Lunch (on your own)*
- 2:00–2:50 **Yat Tin Chow** (University of California, Riverside (UC Riverside))  
*A numerical method of solving high dimensional Hamilton-Jacobi equations with generalized Hopf-Lax formula*
- 3:00–3:30 *Break*
- 3:30–4:20 **Gang George Yin** (Wayne State University)  
*High-Dimensional HJBs: Mean-Field Limits and McKean-Vlasov Equations*

### Wednesday April 1, 2020

- 9:00–9:50 **Christian Chilan** (University of Illinois at Urbana-Champaign)  
*Optimal Nonlinear Control Using Hamilton–Jacobi–Bellman Viscosity Solutions on Quasi-Monte Carlo Grids*
- 10:00–10:30 *Break*
- 10:30–11:20 **Jerome Darbon** (Brown University)  
*Overcoming the curse of dimensionality for some Hamilton–Jacobi partial differential equations via neural network architectures*
- 11:30–12:00 *Break*
- 12:00–12:50 **Karl Kunisch** (Universität Graz )  
*Solution Concepts for Optimal Feedback Control of Nonlinear Partial Differential Equations*
- 1:00–2:00 *Lunch (on your own)*
- 2:00–2:50 **Stanley Osher** (University of California, Los Angeles (UCLA))  
*Solving high dimensional HJ equations using generalized Hopf-Lax formulas vs using Machine Learning. Presenting with Samy Wu Fung.*
- 3:00–3:30 *Break*
- 3:30–4:20 **Mac McEneaney** (University of California, San Diego (UCSD))  
*Exact Conversion of Second-Order HJ PDE Problems to First-Order HJ PDE Problems*

### Thursday April 2, 2020

- 9:00–9:50 **Wei Kang** (Naval Postgraduate School)  
*Data Development and Deep Learning for HJB Equations*
- 10:00–10:30 *Break*

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- 10:30–11:20 **Alex Lin** (University of California, Los Angeles (UCLA))  
*TBA*
- 11:30–12:00 *Break*
- 12:00–12:50 **Mo Chen** (Simon Fraser University)  
*A Multi-Pronged Approach to Computational Challenges in HJ Reachability*
- 1:00–2:00 *Lunch (on your own)*
- 2:00–2:50 **Ivan Egorov (Yegorov)** (North Dakota State University)  
*Attenuation of the curse of dimensionality in continuous-time nonlinear optimal feedback stabilization problems*
- 3:00–3:30 *Break*
- 3:30–4:20 **Matthew Kirchner** (University of California, Santa Barbara (UCSB))  
*Numeric Methods for Reachability with Applications to Vehicle Problems.*

### Friday April 3, 2020

- 9:00–9:50 **Marianne Akian** (Institut National de Recherche en Informatique et Automatique (INRIA))  
*Probabilistic max-plus schemes for solving Hamilton-Jacobi-Bellman equations*
- 10:00–10:30 *Break*
- 10:30–11:20 **Sylvia Herbert** (University of California, Berkeley (UC Berkeley))  
*Scalability for Hamilton-Jacobi Reachability Analysis: Decomposition, Warm-Start Initialization, and Model Reduction*
- 11:30–12:00 *Break*
- 12:00–12:50 **Somil Bansal** (University of California, Berkeley (UC Berkeley))  
*Scaling Hamilton-Jacobi Reachability Analysis for Robotics: Multi-agent Systems to Real-time Computation*

