

Walid Krichene

CONTACT INFORMATION	Department of Electrical Engineering and Computer Sciences (EECS) University of California Berkeley 652 Sutardja Dai Hall, Berkeley, CA 94720 walid@eecs.berkeley.edu http://www.eecs.berkeley.edu/~walid Phone: (510) 332 7259	
EDUCATION	<p>University of California Berkeley, Berkeley, CA 2011 - 2016 <i>Ph.D. in Electrical Engineering and Computer Sciences</i> Designated Emphasis in Communication Computation and Statistics Thesis: <i>Distributed Learning and Control in Sequential Decision Problems</i> Advisor: Professor Alexandre M. Bayen</p> <p><i>M.S. in Mathematics</i> Thesis: <i>A Lyapunov Approach to First-Order Optimization in Continuous and Discrete Time</i> Advisor: Professor Nikhil Srivastava</p> <p>Ecole des Mines Paristech, Paris, France 2007 - 2010 <i>Masters of Science (Diplôme d'ingénieur)</i> Applied Mathematics Advisor: Professor Brigitte d'Andréa-Novel</p> <p>Caltech, Pasadena, CA 2008 Visiting student with the Control and Dynamical Systems (CDS) department. Advisor: Professor Richard Murray.</p> <p>Lycée Louis Le Grand, Paris, France 2005 - 2007 Preparatory classes for the French national entrance exam to the 'Grandes Ecoles' Science and Engineering schools.</p>	
RESEARCH INTERESTS	Learning theory Convex optimization Stochastic approximation and optimization Control theory Design and analysis of distributed learning algorithms Modeling and control of cyber-physical systems	
AWARDS AND HONORS	<p><i>Leon O. Chua Award</i> for Outstanding Achievement in Nonlinear Science, EECS, UC Berkeley 2015</p> <p><i>Outstanding Graduate Student Instructor Award</i>, UC Berkeley 2015</p> <p><i>Distinguished Graduate Student Instructor Award</i>, EECS, UC Berkeley 2014</p> <p><i>Eltoukhy East-West Gateway Fellow</i>, UC Berkeley 2012</p> <p><i>Chevron-Xenel Gateway Fellow</i>, UC Berkeley 2011</p> <p><i>EECS Excellence award</i>, UC Berkeley 2011</p> <p><i>Egide Fellow</i> awarded by the French Ministry of Foreign Affairs 2007</p> <p><i>Bronze Medal</i> in the Pan African Mathematics Olympiad 2005</p> <p><i>Presidential Prize and Valedictorian</i> of the Tunisian Mathematics Baccalauréat 2005</p>	

RESEARCH
EXPERIENCE

Foundations of Resilient Cyber-Physical Systems group (FORCES) since Aug. 2013
UC Berkeley, CA

Graduate Student Researcher (Advisor: Prof. Alexandre Bayen)

Design and analysis of distributed learning algorithms in sequential decision problems under stochastic perturbations. Applications to learning in congestion games. Modeling of congestion in transportation networks.

Partners for Advanced Transportation Technology (PATH) Aug. 2011 - May 2013
Berkeley, CA

Graduate Student Researcher (Advisor: Prof. Alexandre Bayen)

Game theoretic routing of flow on a congestion network. Study of optimal Stackelberg routing strategies and application to traffic networks.

INRIA Aug. 2012 - Sep. 2012

Sophia Antipolis, France

Visiting Researcher (Advisor: Dr. Paola Goatin)

Part of the *optimal reroute strategies for traffic management* team (Oreste). Optimal routing of flow on networks with discretized conservation laws, ramp metering and optimal rerouting using the adjoint method.

California Center for Innovative Transportation (CCIT) Apr. 2010 - Aug. 2010
Berkeley, CA

Visiting Student Researcher (Advisor: Prof. Alexandre Bayen)

Mobile Millennium project. Modeling the dynamics of the Bay Area traffic network using a Hidden Markov Model, and estimating travel times using approximate inference for computational tractability. Study of a graph partitioning problem to minimize approximation error.

Control and Dynamical Systems (CDS), Caltech Sep. 2008 - Feb. 2009
Pasadena, CA

Visiting Student Researcher (Advisor: Prof. Richard Murray)

Verification of the reliability of the Lost Wingman protocol for flight formation keeping between a human-controlled aircraft and a UAV. Modeling the protocol using temporal logic, proving controllability of the system, and proving safety properties such as proof of no collision.

INDUSTRY
EXPERIENCE

Facebook May 2013 - Aug. 2013
Menlo Park, CA

Software Engineer and Data Scientist Intern (Supervisor: Dr. Zoe Abrams)

Modeling and statistical learning of user attention. Implementation of a Hadoop data processing pipeline for user attention estimation.

Criteo Labs Sep. 2010 - Jul. 2011
Paris, France

Research Software Developer (Supervisors: Bertrand Almeras and Franck Le Ouay)

Prediction of Click Through Rate (CTR) of targeted online advertising using tree-based learning models (regularized regression trees, gradient boosted regression trees) and regularized logistic regression.

Google Jun. 2009 - Aug. 2009
Wroclaw, Poland

Intern

Development of web applications using Google Web Toolkit. Optimization of a k-NN search algorithm in high dimensionality feature spaces.

ACADEMIC AND COMMUNITY SERVICE	Conference reviewer:	
	– IEEE Conference on Decision and Control (CDC),	2013-2015
	– American Control Conference (ACC),	2013-2015
	– IEEE Conference on Intelligent Transportation Systems (ITSC)	2013
	Journal reviewer:	
	– IEEE Transactions on Automatic Control (TAC),	2014-2015
	– IEEE Transactions on Network Science and Engineering (TNSE)	2015
	Student Admission Officer	2012
	Admission Committee, Control, Intelligent systems and Robotics, EECS department, UC Berkeley.	
	Member of the Institute of Electrical and Electronics Engineers (IEEE)	since 2012.
Member of the Association for Computing Machinery (ACM)	since 2015.	
TEACHING EXPERIENCE	Optimization Methods in Finance	Fall 2014
	Masters of Financial Engineering, (MFE 230P) Haas School of Business, UC Berkeley. Graduate Student Instructor, main instructor: Prof. Laurent El Ghaoui Recipient of the Berkeley Outstanding Graduate Instructor Award.	
	Feedback Control Systems	Fall 2013
	Electrical Engineering and Computer Sciences (EE128), UC Berkeley. Graduate Student Instructor and substitute lecturer, main instructor: Prof. Alexandre Bayen Recipient of the EECS Distinguished Student Teaching Award.	
	Control and optimization of distributed parameter systems	Spring 2013
Electrical Engineering and Computer Sciences (EE C291), UC Berkeley. Substitute lecturer, main instructor: Prof. Alexandre Bayen.		
STUDENT MENTORSHIP	Kiet Lam, undergraduate student, EECS, Berkeley.	2015
	Worked on developing a web application to implement a repeated routing game.	
	Syrine Krichene, visiting research student from ENSIMAG school of Computer Science and Applied Mathematics of Grenoble, France.	2014
	Worked on stochastic optimization with applications to distributed routing.	
	Milena Suarez Castillo, visiting research student from Ecole Polytechnique, France.	2014
	Worked on optimal routing under no-regret dynamics.	
	Benjamin Drighès, visiting research student from Ecole Polytechnique, France.	2013
	Worked on repeated routing, online learning, and no-regret algorithms. Recipient of the <i>Best Internship Award</i> (Prix d'Option) from Ecole Polytechnique.	
Yasser Jebbari, visiting research student from Ecole Polytechnique, France.	2012	
Worked on routing games and Stackelberg thresholds for networks with horizontal queues.		
Private tutor in undergraduate Mathematics and Computer Science, Lycée Hoche, Lycée Saint-Louis, and Pierre et Marie Curie University, Paris, France.	2007-2010	
ACADEMIC PUBLICATIONS	Journal Publications (published or in review)	
	1. W. Krichene, B. Drighès, and A. Bayen. Online learning of Nash equilibria in congestion games. <i>SIAM Journal on Control and Optimization (SICON)</i> , 53(2):1056–1081, 2015	
	2. W. Krichene, J. Reilly, S. Amin, and A. Bayen. Stackelberg routing on parallel networks with horizontal queues. <i>IEEE Transactions on Automatic Control (TAC)</i> , 59(3):714–727, March 2014	

3. W. Krichene, A. Bayen, and P. Bartlett. A Lyapunov approach to first-order methods for convex optimization, in continuous and discrete time. *SIAM Journal on Optimization (SIOPT)*, submitted, December 2015
4. M. Suarez, W. Krichene, and A. Bayen. On social optimal routing under selfish learning. *Transactions on Control of Networked Systems (TCNS)*, submitted, October 2015
5. M. Delle Monache, J. Reilly, S. Samaranayake, W. Krichene, P. Goatin, and A. Bayen. A PDE-ODE model for a junction with ramp buffer. *SIAM Journal on Applied Mathematics (SIAP)*, 74(1):22–39, 2014
6. S. Samaranayake, W. Krichene, J. Reilly, M. Delle Monache, P. Goatin, and A. Bayen. Discrete-time system optimal dynamic traffic assignment (SO-DTA) with partial control for horizontal queuing networks. *Transportation Science*, submitted, July 2015
7. J. Reilly, S. Samaranayake, M. Delle Monache, W. Krichene, P. Goatin, and A. Bayen. Adjoint-based optimization on a network of discretized scalar conservation laws with applications to coordinated ramp metering. *Journal of Optimization Theory and Applications (JOTA)*, 167(2):733–760, 2015

Journal Publications (in preparation)

1. W. Krichene, M. Balandat, C. Tomlin, and A. Bayen. Dual averaging on compactly supported distributions, and applications to no-regret learning on a continuum. *In preparation*, 2015
2. M. Pilanci, W. Krichene, L. El Ghaoui, Tao Zhu, Thanh Ngo. “Robust Independent Likelihood Resource Allocation”, in preparation.

Refereed Conference Publications

Computer Science Conferences

1. W. Krichene, A. Bayen, and P. Bartlett. Accelerated mirror descent in continuous and discrete time. In *29th Annual Conference on Neural Information Processing Systems (NIPS)*, Montreal, Canada, 2015
2. W. Krichene, M. Balandat, C. Tomlin, and A. Bayen. The hedge algorithm on a continuum. In *32nd International Conference on Machine Learning (ICML)*, pages 824–832, Lille, France, 2015
3. W. Krichene, B. Drighès, and A. Bayen. On the convergence of no-regret learning in selfish routing. In *31st International Conference on Machine Learning (ICML)*, pages 163–171, Beijing, China, 2014

Engineering Conferences

1. W. Krichene, S. Krichene, and A. Bayen. Efficient Bregman projections onto the simplex. In *54th IEEE Conference on Decision and Control (CDC)*, Osaka, Japan, 2015
2. S. Krichene, W. Krichene, R. Dong, and A. Bayen. Convergence of heterogeneous distributed learning in stochastic routing games. In *53rd Annual Allerton Conference on Communication, Control and Computing*, Monticello, IL, 2015
3. W. Krichene, S. Krichene, and A. Bayen. Convergence of mirror descent dynamics in the routing game. In *European Control Conference (ECC)*, Linz, Austria, 2015
4. B. Drighès, W. Krichene, and A. Bayen. Stability of Nash equilibria in the congestion game under replicator dynamics. In *53rd IEEE Conference on Decision and Control (CDC)*, pages 1923 – 1929, Los Angeles, CA, 2014
5. Y. Jebbari, W. Krichene, J. D. Reilly, and A. M. Bayen. Stackelberg thresholds on parallel networks with horizontal queues. In *IEEE 52nd Conference on Decision and Control (CDC)*, pages 268–274, Florence, Italy, 2013

6. F. Farokhi, W. Krichene, A. M. Bayen, and K. H. Johansson. A heterogeneous routing game. In *51st Allerton Conference on Communication, Control and Computing (Allerton)*, pages 448–455, Monticello, IL, 2013
7. W. Krichene, J. Reilly, S. Amin, A. Bayen. “On Stackelberg Routing on Parallel Networks with Horizontal Queues”, *51st IEEE Conference on Decision and Control (CDC)*, pp. 7126–7132, 2012.
8. W. Krichene, J. Reilly, S. Amin, and A. Bayen. On the characterization and computation of Nash equilibria on parallel networks with horizontal queues. In *IEEE 51st Annual Conference on Decision and Control (CDC)*, pages 7119–7125, Maui, HI, Dec 2012

INVITED TALKS
AND SEMINARS

- “Accelerated Mirror Descent in Continuous and Discrete Time.” Dec. 9, 2015
29th Annual Conference on Neural Information Processing Systems (NIPS),
Montréal, Canada.
- “Efficient Bregman Projections onto the Simplex.” Dec. 16, 2015
54th IEEE Conference on Decision and Control (CDC), Osaka, Japan.
- “Distributed Learning in Routing Games: Convergence, Estimation of Player
Dynamics, and Control” Nov. 18, 2015
IPAM Workshop on New Directions in Mathematical Approaches for Traffic
Flow Management. Los Angeles, CA. Host: Prof. Christian Ratsch.
- “A Lyapunov Approach to First-Order Optimization in Continuous
and Discrete Time” Nov. 6, 2015
Semi-autonomous control seminar, Berkeley, CA. Host: Prof. Shankar Sastry.
- “Convergence of Mirror Descent Dynamics in the Routing Game.” Jul. 15, 2015
European Control Conference (ECC), Linz, Austria.
- “The Hedge Algorithm on a Continuum.” Jul. 10, 2015
32nd International Conference on Machine Learning (ICML), Lille, France.
- “Stability of Nash equilibria in Congestion Games under Replicator Dynamics.” Dec. 15, 2014
53rd IEEE Conference on Decision and Control (CDC), Los Angeles, CA.
- “On the Convergence of Online Learning in Selfish Routing” Jun. 23, 2014
31st International Conference on Machine Learning (ICML), Beijing, China.
- “Routing games - Stackelberg routing and online learning” May 30, 2014
UCSB Control Seminar, Santa Barbara. Host: Prof. Joao Hespanha.
- “Stackelberg Thresholds on Parallel Networks with Horizontal Queues” Dec. 10, 2013
52nd IEEE Conference on Decision and Control, Florence, Italy.
- “Online Learning and Games” Nov. 15, 2013
Network economics seminar, UC Berkeley, CA. Host: Prof. Jean Walrand.
- “Selfish Routing and the Experts Algorithm” May 17, 2013
Cyber Physical Systems seminar, UC Berkeley, CA. Host: Prof. Shankar Sastry.
- “Stackelberg Routing Games on Transportation Networks” Jan. 25, 2013
Exquisitus Seminar, School of Electrical and Electronic Engineering,
Nanyang Technical University, Singapore. Host: Prof. Lihua Xie.
- “On Stackelberg Routing on Networks with Horizontal Queues” Dec. 13, 2012
51st IEEE Conference on Decision and Control (CDC), Maui, Hawaii.
- “Adjoint-based control of traffic systems - application to highway ramp metering.” Nov. 21 2012
*Connected Corridors research seminar, Partners for Advanced Transportation
Technology (PATH)*, UC Berkeley, CA. Host: Prof. Roberto Horowitz.
- “Travel time estimation using approximate inference on graphical models” Sep. 23, 2010
Ecole des Mines Paristech, Paris, France. Host: Prof. Brigitte d’Andréa-Novel.