

Alexandre M. Bayen

Assistant Professor

Department of Civil and Environmental Engineering

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EDUCATION

Stanford University, Stanford, California

Ph.D. in Aeronautics and Astronautics, Jan. 2004

Dissertation title: *Computational control of networks of dynamical systems: application to the National Airspace System*

Stanford University, Stanford, California

M.S. in Aeronautics and Astronautics, June 1999

Ecole Polytechnique, France

Eng. Deg. in Applied Mathematics, July 1998

AWARDS

TRANNY Award, California Department of Transportation	2009
CAREER Award, National Science Foundation	2009
Best of ITS Award, citation for “Best Innovating Practice”, 15th World Congress on ITS	2008
Clean Technology Innovation Prize, Berkeley Center for Entrepreneurship & Technology	2008
William F. Ballhaus Prize for Outstanding Doctoral Dissertation, Stanford University	2004

HONORS

NAE Frontiers of Engineering participant	2008
Outstanding Automatica Reviewer	2003
Graduate Fellow of the Délégation Générale pour l’Armement, France	1998 - 2002
Medaille de la Defense Nationale as a Second Lieutenant, Landau in der Pfalz, Germany	1996
Three Letters of Commendation as a Second Lieutenant, France	1996, 1997, 1998

ACADEMIC EXPERIENCE

Assistant Professor, University of California at Berkeley Mar. 2005 - Present
Teaching and performing research in the area of systems engineering

Visiting Scientist, NASA Ames Research Center Jan. 2001 - Dec. 2003
Performing research in the area of air traffic control

Research Assistant, Aeronautics and Astronautics, Stanford University Sept. 1998 - Dec. 2003
Performing research in the area of control theory (Advisor: Professor Claire Tomlin)

PROFESSIONAL EXPERIENCE

Major, Research Director, Autonomous Navigation Laboratory Jan. 2004 - Mar. 2005
Délégation Générale pour l'Armement, Ministère de la Défense, Vernon, France
In charge of a team of 18 researchers focused on building UAVs with off the shelf components

First Lieutenant, Ecole Polytechnique, Palaiseau, France Sept. 1996 - Sept. 1998
Engineering training

Second Lieutenant, 6th Maintenance Unit Regiment Sept. 1995 - Sept. 1996
French Forces in Germany, Landau in der Pfalz, Germany

COURSES TAUGHT

CE291-ME236-EE291c Control and Optimization of Distributed Parameters Systems [3 units]
CE191 Civil and Environmental Engineering Systems Analysis [3 units]
E7 (formerly E77) Introduction to computer programming for scientists and engineers [4 units]
CE290Z Selected Topics in Air Transportation [2 units]
EE291e Hybrid and embedded systems (guest lecturer) [3 units]

RESEARCH SUPERVISION

M.S. Students

Christian Claudel, EECS, UC Berkeley 2009
M.S. thesis title: *Solutions to switched Hamilton-Jacobi equations and conservation laws using hybrid components.*

Aude Hofleitner, Ecole Nationale des Ponts et Chausees, France 2009
M.S. thesis title: *Using cellular phones for traffic monitoring.*

Julie Percelay, Ecole Nationale des Ponts et Chausees, visiting graduate student 2008
M.S. thesis title: *Data assimilation algorithms for shallow water flows.*

Jessica Pannequin, EECS, UC Berkeley 2007
M.S. thesis title: *Nonlinear model predictive control applied to multiple aircraft deconflicted path planning with weather avoidance constraints.*

Stephane Martinez, Ecole Nationale de l'Aviation Civile, France 2007
M.S. thesis title: *Dynamic sectorization of the airspace.*

Past Ph.D. Students

- Dr. Dengfeng Sun, Civil and Environmental Engineering (Systems Engineering) 2008
Ph.D. thesis title: *Large-scale modeling and optimization of en-route air traffic flow*.
Current position: Assistant Professor, Aeronautics and Astronautics, Purdue University.
- Dr. Juan-Carlos Herrera, Civil and Environmental Engineering (Transportation Engineering) 2009
Ph.D. thesis title: *Using GPS-enabled cellular phones as traffic probes*.
Current position: Assistant Professor, Civil Engineering, Pontificia Universidad Catolica de Chile.
- Dr. Issam Strub, Civil and Environmental Engineering (Systems Engineering) 2009
Ph.D. thesis title: *Modeling and simulation of large scale distributed parameter systems*.
Current position: Post doctoral researcher, UC Berkeley.

Current Ph.D. Students

- Daniel Work, CEE Systems, advised since Mar. 2007. Expected graduation: Spring 2010
Ph.D. thesis title: *Inverse modeling algorithms for traffic flow reconstruction using smartphones*.
- Saurabh Amin¹, CEE Systems, advised since June 2005. Expected graduation: Spring 2010
Ph.D. thesis title: *Privacy aware estimation and inference in distributed parameter systems*.
- Qingfang Wu, CEE Env. Eng., advised since Sept. 2005. Expected graduation: Spring 2010
Ph.D. thesis title: *Spectral methods based data assimilation of tidally forced hydrodynamic networks*.
- Christian Claudel, EECS, advised since Sept. 2007. Expected graduation: Spring 2011
Ph.D. thesis title: *Incorporation of Lagrangian data in Hamilton-Jacobi equations*.
- Andrew Tinka, EECS, advised since Sept. 2006. Expected graduation: Spring 2011
Ph.D. thesis title: *Adaptive sampling of shallow water flows using floating robotics platforms*.
- Ryan Herring, IEOR, advised since Sept. 2007. Expected graduation: Spring 2010
Ph.D. thesis title: *Optimization based estimation of arterial traffic congestion level*.
- Tarek Rabbani, ME, advised since Sept. 2007. Expected graduation: Spring 2011
Ph.D. thesis title: *Differential flatness based control and estimation of hydraulic systems*.
- Sebastien Blandin, CEE Systems, advised since Mar. 2007. Expected graduation: Spring 2011
Ph.D. thesis title: *Robust travel time estimation using traffic flow models for highways*.
- Mohammad Rafiee, ME, advised since Sept. 2008. Expected graduation: Spring 2012
Ph.D. thesis title: *Data assimilation for shallow water equations using consensus methods*.

Incoming Ph.D. Students

- Aude Hoffleitner, EECS, advised since July 2008. Expected graduation: Spring 2013
Ph.D. thesis title: *Machine learning based travel time estimation for arterial networks*.
- Pierre Mazare, CEE Transportation, advised since June 2009. Expected graduation: Spring 2014
Ph.D. thesis title: *Dynamic routing in the presence of uncertainty in hybrid transportation networks*.
- Samitha Samaranayake, CEE Systems, incoming. Expected graduation: Spring 2014
Ph.D. thesis title: *Stochastic routing algorithms for mixed arterial-highway networks*.

¹Co-advised with Professor Shankar Sastry.

Post Doctoral Researchers

Dr. Jeff Ban May 2007 - Aug. 2008
Ph.D. CEE, University of Wisconsin-Madison, 2004.
Research topic: Sensor placement, mobile sensing, traffic information systems.

Dr. Annalisa Scacchioli² Jan. 2007 - Mar. 2008
Ph.D. EECS, University of L'Aquila, Italy, 2005.
Research topic: Prediction of uncertainty propagation in hybrid simulations.

Dr. Olli-Pekka Tossavainen Aug. 2007 - Present
Ph.D. Physics, University of Kuopio, Finland, 2007. Advised since August 2007.
Research topic: Inverse modeling algorithms for Lagrangian sensor networks.

ACADEMIC SERVICE

College of Engineering

Advisory Committee on International Collaboration Spring 2008 - Present
Committee on Computing and Computer Sciences Education Spring 2007 - present
Taskforce on Control Courses in the College of Engineering Fall 2007
CITRIS Building Cyber Cafe Space Committee Fall 2005 - Spring 2007

Civil and Environmental Engineering Department

Certificate Program in Intelligent Transportation Systems Taskforce Fall 2005 - Spring 2006
Strategic Planning Committee Fall 2007
Systems Committee Fall 2005 - present

PROFESSIONAL QUALIFICATIONS

Major (Ingenieur Principal de l'Armement), Department of Defense, France.
Promoted Major in 2004, currently on leave.

PROFESSIONAL AFFILIATIONS

IEEE, Institute of Electrical and Electronics Engineers
AIAA, American Institute of Aeronautics and Astronautics

PROFESSIONAL SERVICE

Workshop or conference organizer, program committee

Member of the Program Committee 2008, 2009
International Workshop Hybrid Systems: Computation and Control (HSCC)

Panel Session Chair: Industry Applications, VOLVO Week 2008
VOLVO Center for Future Urban Transport

Invited Session Organizer and Chair, "Multi Agent System Analysis" 2007
2007 American Control Conference

Organizing Committee Member 2002
5th International Workshop Hybrid Systems: Computation and Control (HSCC)

²Co-advised with Professor Božidar Stojadinović.

Workshop Chair or Co-Chair

- Workshop Co-Chair and organizer* 2008
“Irrigation channels and related problems”
Consiglio Nazionale delle Ricerche (CNR), Italy
- Workshop Co-Chair and organizer* 2008
2008 EU-US08: workshop on cyberphysical systems
KTH, Stockholm, Sweden
- Workshop organizer and Co-Chair* 2007
Satellite workshop, “Modeling and control of physical networks”
10th International Workshop Hybrid Systems: Computation and Control (HSCC), Pisa, Italy
- Tutorial session Co-Chair and organizer* 2006
“Modeling, Optimization and Software in Air Traffic Management”
45th IEEE Conference on Decision and Control, San Diego, CA

Other service to the profession

- Organizer of the *Nokia Distinguished Lectures on Cyber Physical Systems* Fall 2008
Created the event, programmed lecture series, hosted the speakers and organized the live broadcast and archival of videos, CITRIS, UC Berkeley
- Invited Professor, HYCON graduate school on control Jan. 12th-Jan. 16th, 2009
European Embedded Control Institute, Supelec, France
Verification and control of nonlinear systems
- Invited Professor, HYCON graduate school on control Mar. 25th - Mar. 28th, 2008
European Embedded Control Institute, Supelec, France
Verification and control of nonlinear systems

Reviewer activities

- *Proposal review – Panel reviews*
 - Istituto Nazionale di Alta Matematica (INdAM), Italy 2005
 - National Science Foundation (NSF), panel number(s) and directorate(s) confidential 2008
- *Journal referee*
 - ASME Journal of Dynamic Systems, Measurement and Control 2008 - 2009
 - Transportation Science 2006, 2008 - 2009
 - Proceedings of the IEEE 2008
 - IEEE Transactions on Automatic Control 2002, 2006 - 2007
 - SIAM Journal on Control and Optimization 2006, 2009
 - IEEE Transactions on Control Systems Technology 2002 - 2004
 - IEEE Transactions on Intelligent Transportation Systems 2004
 - ASCE Journal of Infrastructure Systems 2005
 - AIAA Journal on Guidance, Control and Dynamics 2003, 2005
 - AIAA Journal of Aircraft 2007
 - IFAC Control Engineering Practice 2003
 - Networks and Heterogeneous Media 2007
 - Air Traffic Control Quarterly 2003
 - Automatica 2002 - 2004
 - International Journal on Robust and Nonlinear Control 2005 - 2006
 - International Game Theory Review 2002

- *Conference referee*
 - World Conference on Transportation Research (WCTR) 2007
 - Conference on Decision and Control (CDC) 2001 - 2007, 2009
 - American Control Conference (ACC) 2002 - 2007, 2009
 - International Workshop Hybrid Systems: Computation and Control 2001 - 2005, 2008
 - AIAA Conference on Guidance, Control and Dynamics 2004 - 2006

CONSULTING EXPERIENCE

- Co-founder, member of the board* 2003
 Laboratoire des Systèmes Tychastiques Régulés (LASTRE), Paris, France
- Co-founder, member of the board* 2007
 VIMADES Inc., Paris, France

PUBLICATIONS

Underlined names are students, post doctoral researchers or staff working in the capacity of an advisee on the corresponding articles.

Journal publications (published, in press, accepted)

1. T. Rabbani, S. Munier, D. Dorchies, P.-O. Malaterre, A. Bayen and X. Litrico, “Flatness-based control of an irrigation canal using SCADA,” *IEEE Controls Systems Magazine*, 2009.
2. T. Rabbani, F. Di Meglio, X. Litrico and A. Bayen, “Feed-forward control of open channel flow using differential flatness,” *IEEE Transactions on Control Systems Technology*, 2009.
doi:10.1109/TCST.2009.2014640
3. E. Lobaton and A. Bayen, “Modeling and optimization analysis of a single-flagellum microstructure through the method of regularized Stokeslets,” *IEEE Transactions on Control Systems Technology*, 2009.
doi:10.1109/TCST.2008.2011889
4. I. Strub, J. Percelay, O.-P. Tossavainen and A. Bayen, “Comparison of two data assimilation algorithms for shallow water flows,” *Networks and Heterogeneous Media*, 2009, 4(2), pp. 409-430.
doi:10.3934/nhm.2009.4.409
5. I. Strub, J. Percelay, M. Stacey and A. Bayen, “Inverse estimation of open boundary conditions in tidal channels,” *Ocean Modeling*, 2009, 29(1), pp. 85-93.
doi:10.1016/j.ocemod.2009.03.002
6. Q. Wu, X. Litrico and A. Bayen, “Data reconciliation of an open channel flow network using modal decomposition,” *Advances in Water Resources*, 2009, 32(2), pp. 193-204.
doi:10.1016/j.advwatres.2008.10.009
7. D. Work and A. Bayen, “Convex formulations of air traffic flow optimization problems,” *Proceedings of the IEEE*, 2008, Vol. 96, No. 12, pp. 2096-2112.
doi:10.1109/JPROC.2008.2006150

8. J.-P. Aubin, A. Bayen and P. Saint-Pierre, "Dirichlet problems for some Hamilton-Jacobi equations with inequality constraints," *SIAM Journal on Control and Optimization*, 2008, 47(5), pp. 2348-2380.
doi:10.1137/060659569
9. D. Sun and A. Bayen, "A multicommodity Eulerian-Lagrangian large-capacity cell transmission model for en route traffic," *AIAA Journal of Guidance, Control and Dynamics*, 2007, 31(3), pp. 616-628.
doi:10.2514/1.31717
10. D. Sun, I. Strub and A. Bayen, "Comparison of the performance of four Eulerian network flow models for strategic air traffic management," *Networks and Heterogeneous Media*, 2007, 2(4), pp. 569-594.
doi:10.3934/nhm.2009.2.569
11. M. Oishi, I. Mitchell, A. Bayen and C. Tomlin, "Invariance-preserving abstractions of hybrid systems: Application to user-interface design," *IEEE Transactions on Control Systems Technology*, 2007, 16(2), pp. 229-244.
doi:10.1109/TCST.2007.903370
12. A. Bayen, I. Mitchell, M. Oishi and C. Tomlin, "Aircraft autolander safety through optimal control based reach set computation," *AIAA Journal on Guidance, Control and Dynamics*, January 2007, 30(1), pp. 68-77.
doi:10.2514/1.21562
13. I. Strub and A. Bayen, "Weak formulation of boundary conditions for scalar conservation laws: An application to highway traffic modeling," *International Journal on Robust and Nonlinear Control*, November 2006, 16(16), pp. 733-748.
doi: 10.1002/rnc.1099
14. A. Bayen, R. Raffard and C. Tomlin, "Adjoint-based control of a new Eulerian network model of air traffic flow," *IEEE Transactions on Control Systems Technology*, September 2006, 14(5), pp. 804-818.
doi:10.1109/TCST.2006.876904
15. I. Mitchell, A. Bayen and C. Tomlin, "A time dependent Hamilton-Jacobi formulation of reachable sets for continuous dynamic games," *IEEE Transactions on Automatic Control*, July 2005, 50(7), pp. 947-957.
doi:10.1109/TAC.2005.851439
16. A. Bayen, P. Grieder, G. Meyer and C. Tomlin, "Lagrangian delay predictive model for sector-based air traffic flow," *AIAA Journal on Guidance, Control, and Dynamics*, September 2005, 28(5), pp. 1015-1026.
doi:10.2514/1.15242
17. C. Tomlin, I. Mitchell, A. Bayen and M. Oishi, "Computational techniques for the verification of hybrid systems," *Proceedings of the IEEE*, 2003, 91(7), pp. 986-1001.
doi:10.1109/JPROC.2003.814621

Journal status conference publications (published, in press, accepted)

1. X. Ban, R. Herring, J.-D. Margulici, A. Bayen, "Optimal sensor placement for freeway travel time estimation," *18th International Symposium on Transportation and Traffic Theory (ISTTT)*, July 2009.

2. B. Hoh, M. Gruteser, R. Herring, J. Ban, D. Work, J.-C. Herrera, A. Bayen, M. Annavaram, Q. Jacobson, "Virtual trip lines for distributed privacy preserving traffic monitoring," *Mobile Systems and Applications (MOBISYS)*, June 17-18 2008, Breckenridge, CO. [AR 18%]
doi:10.1145/1378600.1378604

Journal publications (in review)

1. S. Blandin, D. Work, P. Goatin, B. Piccoli and A. Bayen, "A general phase transition model for vehicular traffic," *SIAM Journal on Applied Mathematics*, submitted March 2009.
2. D. Work, S. Blandin, O.-P. Tossavainen, B. Piccoli and A. Bayen, "A distributed highway velocity model for traffic state reconstruction," *Applied Mathematics and Optimization*, submitted June 2009.
3. C. Claudel and A. Bayen, "Lax-Hopf based incorporation of internal boundary conditions into Hamilton-Jacobi equation. Part I: Theory *IEEE Transactions on Automatic Control*, submitted April 2008, resubmitted April 2009.
4. C. Claudel and A. Bayen, "Lax-Hopf based incorporation of internal boundary conditions into Hamilton-Jacobi equation. Part II: Computational methods," *IEEE Transactions on Automatic Control*, submitted June 2008, resubmitted April 2009.
5. S. Amin, F. Hante and A. Bayen, "Exponential stability of switched hyperbolic systems in a bounded domain," *Automatica*, submitted June 2008, resubmitted March 2009.
6. D. Sun, A. Clinet and A. Bayen, "A dual decomposition method for sector capacity constrained traffic flow optimization," *IEEE Transactions on Control Systems Technology*, submitted February 2009.
7. J.-C. Herrera and A. Bayen, "Incorporation of Lagrangian measurements in freeway traffic state estimation," *Transportation Research B*. Submitted July 2008, resubmitted March 2009, resubmitted May 2009, resubmitted June 2009.
8. J.-C. Herrera, D. Work, X. Ban, R. Herring, Q. Jacobson and A. Bayen, "Evaluation of traffic data obtained via GPS-enabled mobile phones: the Mobile Century field experiment," *Transportation Research C*. Submitted March 2009, resubmitted June 2009.

Conference publications (published, in press, accepted)

Lecture Notes in Computer Science

1. S. Amin, F. Hante and A. Bayen, "On stability of switched linear hyperbolic conservation laws with reflecting boundaries," *Hybrid Systems: Computation and Control (M. Egerstedt and B. Mishra, Eds.)*, Lecture Notes in Computer Science 4981, pp. 602-605, Springer-Verlag, March 2008.
2. C. Claudel and A. Bayen, "Solutions to switched Hamilton-Jacobi equations and conservation laws using hybrid component," *Hybrid Systems: Computation and Control (M. Egerstedt and B. Mishra, Eds.)*, Lecture Notes in Computer Science 4981, pp. 101-115, Springer-Verlag, March 2008.

3. A. Bayen, C. Claudel and P. Saint-Pierre, “Viability-based computations of solutions to the Hamilton-Jacobi-Bellman equation,” *Hybrid Systems: Computation and Control* (A. Bemporad, A. Bicchi, G. Buttazzo, Eds.), Lecture Notes in Computer Science 4416, pp. 645-649, Springer-Verlag, March 2007.
4. I. Strub and A. Bayen, “Mixed initial-boundary value problems for scalar conservation laws: application to the modeling of transportation networks,” *Hybrid Systems: Computation and Control* (J. Hespanha, A. Tiwari, Eds.), Lecture Notes in Computer Science 3927, pp. 552-567, Springer-Verlag, March 2006.
5. A. Bayen, R. Raffard and C. Tomlin, “Network congestion alleviation using adjoint hybrid control: application to highways,” *Hybrid Systems: Computation and Control* (R. Alur, G. Pappas, Eds.), Lecture Notes in Computer Science 2993, pp. 95-110, Springer-Verlag, March 2004.
6. A. Bayen, E. Cruck and C. Tomlin, “Guaranteed overapproximations of unsafe sets for continuous and hybrid systems: solving the Hamilton-Jacobi equation using viability techniques,” *Hybrid Systems: Computation and Control* (C. Tomlin and M. Greenstreet, Eds.), Lecture Notes in Computer Science 2289, pp. 90-104, Springer-Verlag, March 2002.
7. I. Mitchell, A. Bayen and C. Tomlin, “Validating a Hamilton-Jacobi approximation to hybrid system reachable sets,” *Hybrid Systems: Computation and Control* (M. D. Di Benedetto and A. Sangiovanni-Vincentelli, Eds.), Lecture Notes in Computer Science 2034, pp. 418-432, Springer-Verlag, March 2001.

Engineering Conferences

1. D. Work, O.-P. Tossavainen, Q. Jacobson and A. Bayen, “Lagrangian sensing: Traffic estimation with mobile devices”, To appear: *Proceedings of the 2009 American Control Conference*, June 2009.
2. A. Tinka, S. Diemer, L. Madureira, E. Marques, J. Sousa, R. Martins, J. Pinto, J. Silva, A. Sousa, P. Saint-Pierre and A. Bayen, “Viability-based computation of spatially constrained minimum time trajectories for an autonomous underwater vehicle: implementation and experiments”, To appear: *Proceedings of the 2009 American Control Conference*, June 2009.
3. S. Blandin, D. Work, P. Goatin, B. Piccoli and A. Bayen, “A general phase transition model for vehicular traffic”, To appear: *2009 IFAC workshop on Control of Distributed Parameter Systems*, July 2009.
4. C. Claudel, A. Hoffleitner, N. Mignerey and A. Bayen, “Guaranteed bounds on highway travel times using probe and fixed data”, *88th Transportation Research Board Annual Meeting*, Washington D.C., January 2009.
5. X. Ban, R. Herring, P. Hao and A. Bayen, “Delay pattern estimation for signalized intersections using sampled travel times”, *88th Transportation Research Board Annual Meeting*, January 2009.
6. D. Work, O.-P. Tossavainen, S. Blandin, A. Bayen, T. Iwuchukwu and K. Tracton, “An ensemble Kalman filtering approach to highway traffic estimation using GPS enabled mobile devices”, *Proceedings of the 47th IEEE Conference on Decision and Control*, December 2008, pp. 5062-5068.

7. O.-P. Tossavainen, J. Percelay, A. Tinka, Q. Wu and A. Bayen, “Ensemble Kalman filter based state estimation in 2D shallow water equations using Lagrangian sensing and state augmentation”, *Proceedings of the 47th IEEE Conference on Decision and Control*, December 2008, pp. 1783-1790.
8. S. Amin, F. Hante and A. Bayen, “Stability analysis of linear hyperbolic systems with switching parameters and boundary conditions”, *Proceedings of the 47th IEEE Conference on Decision and Control*, December 2008, pp. 2081-2086.
9. F. Di Meglio, T. Rabbani, X. Litrico and A. Bayen, “Feed-forward river flow control using differential flatness”, *Proceedings of the 47th IEEE Conference on Decision and Control*, December 2008, pp. 3895-3902.
10. D. Work and A. Bayen, “Convex formulations of aggregate network air traffic flow optimization problems”, *Proceedings of the 47th IEEE Conference on Decision and Control*, December 2008, pp. 2141-2147.
11. Q. Wu, X. Litrico and A. Bayen, “Data reconciliation of an open channel flow network using modal decomposition”, *Proceedings of the 47th IEEE Conference on Decision and Control*, December 2008, pp. 3903-3910.
12. C. Claudel and A. Bayen, “Guaranteed bounds for traffic flow parameters estimation using mixed Lagrangian-Eulerian sensing”, *Proceedings of the 46th Annual Allerton Conference on Communication, Control, and Computing*, September 2008.
13. R. Hoffman, D. Sun, A. Clinet, S. Augustine, J. Burke, R. Viswanathan and A. Bayen, “Integration of an aggregate flow model with a traffic flow simulator”, *Proceedings of the AIAA Conference on Guidance, Control and Dynamics*, August 2008, AIAA Paper 2008-6325.
14. J.-C. Herrera and A. Bayen, “Traffic flow reconstruction using mobile sensors and loop detector data,” *Transportation Research Board*, January 2008.
15. S. Munier, Q. Wu, S. Amin, A. Bayen, X. Litrico and G. Belaud, “Parameter identification for the shallow water equations using finite spectrum signal,” *Proceedings of the 46th IEEE Conference on Decision and Control*, December 2007, pp. 1584- 1590.
16. S. Amin, A. Bayen, L. El Ghaoui and S. Sastry, “Robust feasibility for control of water flow in a reservoir-canal system,” *Proceedings of the 46th IEEE Conference on Decision and Control*, December 2007, pp. 1571- 1577.
17. A. Bayen, C. Claudel and P. Saint-Pierre, “Computations of solutions to the Moskowitz Hamilton-Jacobi-Bellman equation under viability constraints,” *Proceedings of the 46th IEEE Conference on Decision and Control*, December 2007, pp. 4737- 4743.
18. S. Martinez, G. Chatterji, D. Sun and A. Bayen, “A weighted graph approach airspace dynamic configuration,” *Proceedings of the 2007 AIAA Conference on Guidance, Navigation and Control*, AIAA-2007-6448, August 2007.
19. J. Pannequin, A. Bayen, H. Chung, I. Mitchell and S. Sastry, “Multiple aircraft deconflicted path planning with weather avoidance constraints,” *Proceedings of the 2007 AIAA Conference on Guidance, Navigation and Control*, AIAA-2007-6588, August 2007.
20. E. Lobaton and A. Bayen, “Modeling and optimization analysis of a single flagellum bacterial motion,” *Proceedings of the 2007 American Control Conference*, New York, NY, pp. 455-461, July 2007.

21. A. Scacchioli, A. Bayen, B. Stojadinovic and S. Takhirov, "Quality of hybrid simulation: how good was your test? A reachability analysis approach," *Proceedings of the 18th Engineering Mechanics Division Conference (EMD2007)*, VA, June 2007.
22. I. Strub and A. Bayen, "Continuous adjoint methods for air traffic flow management," *Proceedings of the 45th IEEE Conference on Decision and Control*, San Diego, CA, pp. 101-106, December 2006.
23. I. Strub and A. Bayen, "Optimal control of air traffic networks using continuous flow models," *Proceedings of the AIAA Conference on Guidance, Navigation and Control*, AIAA Paper 2006-6228, August 2006.
24. D. Sun, S. Yang, I. Strub, A. Bayen, B. Sridhar and K. Sheth, "Eulerian Trilogy," *Proceedings of the AIAA Conference on Guidance, Navigation and Control*, AIAA Paper 2006-6227, August 2006.
25. C. Robelin, D. Sun, G. Wu and A. Bayen, "MILP control of aggregate Eulerian network airspace models," *Proceedings of the 2006 American Control Conference*, pp. 5257-5262, June 2006.
26. J.-P. Aubin, A. Bayen and P. Saint-Pierre, "A viability approach to Hamilton-Jacobi equations: application to concave highway traffic flux functions," *Proceedings of the 44th IEEE Conference on Decision and Control and European Control Conference*, pp. 3519-3524, December 2005.
27. K. Roy, A. Bayen and C. Tomlin, "Polynomial time algorithms for scheduling of arrival aircraft," *Proceedings of the AIAA Conference on Guidance, Navigation and Control*, AIAA Paper 2005-6044, August 2005.
28. R. Raffard, S. Waslander, A. Bayen and C. Tomlin, "Cooperative distributed control for a multi-agent Eulerian air traffic network," *Proceedings of the AIAA Conference on Guidance, Navigation and Control*, AIAA Paper 2005-6050, August 2005.
29. J.-P. Aubin, A. Bayen and P. Saint-Pierre, "Computation and control of solutions to the Burgers equation using viability theory," *Proceedings of the 2005 American Control Conference*, pp. 3906-3911, June 2005.
30. A. Bayen, C. Tomlin, Y. Ye and J. Zhang, "An approximation algorithm for scheduling aircraft with holding time," *Proceedings of the 43rd IEEE Conference on Decision and Control*, pp. 2760-2767, December 2004.
31. A. Bayen, C. Tomlin, T. Callantine, Y. Ye and J. Zhang, "Optimal arrival traffic spacing via dynamic programming," *Proceedings of the AIAA Conference on Guidance, Navigation and Control*, AIAA Paper 2004-5228, August 2004.
32. A. Bayen, R. Raffard and C. Tomlin, "Eulerian Network model of air traffic flow in congested areas," *Proceedings of the 2004 American Control Conference*, pp. 5520-5526, June 2004.
33. A. Bayen, R. Raffard and C. Tomlin, "Adjoint-based constrained control of Eulerian transportation networks: application to Air Traffic Control," *Proceedings of the 2004 American Control Conference*, pp. 5539-5545, June 2004.
34. A. Bayen, C. Tomlin, Y. Ye and J. Zhang, "MILP formulation and polynomial time algorithm for an aircraft scheduling problem," *Proceedings of the 42nd IEEE Conference on Decision and Control*, pp. 5003-5010, December 2003.

35. A. Bayen, S. Santhanam, I. Mitchell and C. Tomlin, "A differential game formulation of alert levels in ETMS data for high altitude traffic," *Proceedings of the AIAA Conference on Guidance, Navigation and Control*, AIAA Paper 2003-5341, August 2003.
36. A. Bayen and C. Tomlin, "Real-time discrete control law synthesis for hybrid systems using MILP: application to congested airspace," *Proceedings of the 2003 American Control Conference*, pp. 4620-4626, June 2003.
37. M. Oishi, I. Mitchell, A. Bayen, C. Tomlin and A. Dagani, "Hybrid verification of an interface for an automatic landing," *Proceedings of the 41st IEEE Conference on Decision and Control*, pp. 1607-1613, December 2002.
38. A. Bayen, P. Grieder and C. Tomlin, "A control theoretic predictive model for sector-based air traffic flow," *Proceedings of the AIAA Conference on Guidance, Navigation and Control*, AIAA Paper 2002-5011, August 2002.
39. A. Bayen, P. Grieder, H. Sipma, G. Meyer and C. Tomlin, "Delay predictive models of the National Airspace System using hybrid control theory," *Proceedings of the 2002 American Control Conference*, pp. 767-772, May 2002.
40. A. Bayen and C. Tomlin, "A construction procedure using characteristics for viscosity solutions of the Hamilton-Jacobi equation," *Proceedings of the 40th IEEE Conference on Decision and Control*, pp. 1657-1662, December 2001.

Non Proceedings Conferences

1. C. Robelin, D. Sun, G. Wu and A. Bayen, "En-route air traffic modeling and strategic flow management using mixed integer linear programming", *INFORMS Annual Meeting 2005*, New Orleans / San Francisco, Nov. 13-16, 2005.
2. D. Sun and A. Bayen, "Modeling and strategic flow management using dual decomposition method," *INFORMS Annual Meeting*, November 2007.

Other publications

Book chapters

1. A. Bayen and C. Tomlin, "A case study: Air Traffic Management systems", *Encyclopedia of Life Support Systems*, Al Gogaisi (Ed.), UNESCO-EOLSS Publishers Co. Ltd. Ref: 6:43:28:8, 2005.
2. C. Tomlin, I. Mitchell and A. Bayen, "Verification of hybrid systems", *Encyclopedia of Life Support Systems*, Al Gogaisi (Ed.), UNESCO-EOLSS Publishers Co. Ltd. Ref: 6:43:28:6, 2005.
3. C. Tomlin, S. Boyd, I. Mitchell, A. Bayen, M. Johansson, and L. Xiao, "Computational Tools for the Verification of Hybrid Systems" *Software-Enabled Control*, Samad and Balas (Eds.), John Wiley, March 2003.

Book

J.-P. Aubin, A. Bayen, N. Bonneuil and P. Saint-Pierre
Elements of viability theory. To appear: Springer-Verlag, 2010.

Doctoral Thesis

A. Bayen, *Computational control of networks of dynamical systems: application to the National Airspace System*, Ph.D. dissertation, Department of Aeronautics and Astronautics, Stanford University, Dec. 2003.

PRESS RELEASES, INTERVIEWS, MEDIA ARTICLES

Press conferences

- *Mobile Millennium*, UC Berkeley, CA November 10, 2008
Held jointly with Nokia, Navteq and the California DOT
- *Safe Trip 21*, Bay Bridge, Oakland, CA June 26, 2008
Held jointly with US DOT and the California DOT
- *Mobile Century*, Union Landing, CA February 8, 2008
Held jointly with Nokia and the California DOT

Press releases

- *University of California at Berkeley*, “Campus dedicates new state-of-the-arts CITRIS research headquarters,” Mar 2, 2009
- *University of California at Berkeley*, “Dedication of new CITRIS headquarters marks new stage of innovation to help fuel economic growth,” Feb. 27, 2009
- *Nokia*, “Nokia Research Center puts Mobile Millennium in gear to help reduce traffic congestion,” Nov. 10, 2008
- *University of California at Berkeley*, “UC Berkeley and Nokia turn mobile phones into traffic probes with launch of pilot traffic-monitoring software,” Nov. 6, 2008
- *ITS America*, “ITS America announces finalists for the 2008 Best of ITS Awards,” Oct. 30, 2008
- *U.S. Department of Transportation*, “U.S. DOT partners with Caltrans to move California drivers one step closer to instant travel information and safety technologies,” Jun. 25, 2008
- *Nokia*, “Nokia and UC Berkeley capture real-time traffic information using GPS enabled mobile devices,” Feb. 8, 2008
- *University of California at Berkeley*, “Joint Nokia research project captures traffic data using GPS-enabled cell phones,” Feb. 8, 2008

TV interviews (selected)

- *CBS’s Smart Planet*, “Alex Bayen, Professor, Systems Engineering, UC Berkeley,” May 29, 2009, by Jason Pepper
- *NBC News*, “Tech Future in Good Hands at Cal,” May 6, 2009
- *Cnet*, “Nokia shows off real-time traffic application,” Nov. 18, 2008
- *BBC News*, “Tech that trumps traffic tangles,” Nov. 18, 2008, by Jason Palmer
- *Cnet*, “Using your cell phone’s GPS to map traffic,” Nov. 11, 2008, by Kara Tsuboi
- *KTVU*, “UC Berkeley To Offer Free Cell Phone GPS Download,” Nov. 10, 2008.
- *CBS News*, “Cal Program Uses Cell Phones to Unjam Traffic,” Nov. 10, 2008
- *ABC News*, “UC Berkeley teams up with Nokia for traffic,” Nov. 10, 2008
- *NBC News*, “Gridlock Gadget: New Cell Phone Software to Help Drivers Avoid Traffic,” Nov. 10, 2008
- *ABC News*, “Real-time traffic information to your cell phone,” Jun. 25, 2008

- *NBC News*, “Bay Area traffic study kicks off,” Jun. 25, 2008
- *Cnet*, “Mobile Sensing-mini subs explore Sacramento,” Jun. 20, 2008
- *Cnet*, “Students get stuck in traffic for Nokia,” Feb. 12, 2008
- *Cnet*, “Nokia trials N95 as traffic monitor,” Feb. 11, 2008
- *CBS News*, “Cal, Nokia test GPS technology for traffic info,” Feb. 8, 2008
- *ABC News*, “Cell phones used to test Easy Bay traffic,” Feb. 8, 2008
- *Cnet*, “Nokia turns people into traffic sensors,” Feb. 8, 2008
- *NBC News*, “Researchers test GPS-cell phone navigation in South Bay,” Feb. 8, 2008
- *Fox News*, “Nokia and UC Berkeley capture real-time traffic information using GPS enabled mobile devices,” Feb. 8, 2008

Radio interviews (selected)

- *Nature-podcast*, “Phoning in Data,” April 23, 2009, by Roberta Kwok
- *KQED*, “Dialing in on Traffic,” Dec. 15, 2008, by David Gorn
- *National Public Radio*, “Who’s Calling? It’s Your Traffic Report,” Jan. 26, 2009, by David Gorn
- *KQED*, “Reporter’s Notes: Dialing in on Traffic,” Dec. 12, 2008, by David Gorn
- *National Public Radio*, “Cell Phones: a new commuter tool?,” Feb. 11, 2008
- *KCBS*, “Researchers road test GPS technology for traffic info,” Feb. 8, 2008

Newspaper interviews or articles (selected)

- *The New York Times*, “Smarter GPS to Let Cellphones Point the Way,” May 3, 2009, by Roy Furchgott
- *Nature*, “Phoning in Data,” April 23, 2009, by Roberta Kwok
- *Die Welt*, “Das Handy wird zum Navi der Zukunft,” March 18, 2009
- *The Sacramento Bee*, “Test program guides travelers by cell phone,” Nov. 25, 2008, by Tony Bizjak
- *New Scientist*, “Cellphone clusters give traffic jams away,” Nov. 22, 2008
- *The New York Times*, “Volunteers Sought for Real-Time Traffic Project,” Nov. 18, 2008 by Roy Furchgott
- *The Earth Times*, “Groundbreaking Debut of Traffic Probe Data at ITS World Congress,” Nov. 17, 2008
- *Contra Costa Times*, “Traffic study goes high tech,” Nov. 13, 2008 by Erik Nelson
- *San Jose Mercury News*, “UC Berkeley software turns cell phones into traffic trackers,” Nov. 13, 2008, by Dennis Cuff
- *The Daily Californian*, “Researchers’ New GPS Software Could Get Drivers Out of a Jam,” Nov. 10, 2008
- *San Francisco Chronicle*, “Cell phones part of traffic monitoring network,” Nov. 10, 2008
- *Forbes*, “Nokia Research Center Pults Mobile Millennium in Gear to Help Reduce Traffic Congestion,” Nov. 10, 2008
- *San Francisco Chronicle*, “GPS Cell phones hooked up to monitor traffic,” Nov. 9, 2008
- *San Francisco Chronicle*, “Plan to avoid traffic jams using cell phones,” Jun. 26, 2008
- *The Oakland Tribune*, “Feds to help world’s largest traffic tech test,” Jun. 25, 2008
- *The Oakland Tribune*, “Experiment uses phones to track I-880 traffic,” Feb. 9, 2008
- *San Jose Mercury News*, “Researchers try tracking traffic using cell phone GPS,” Feb. 9, 2008
- *Los Angeles Times*, “Using cell phones to beat traffic?,” Feb. 9, 2008
- *Tri Valley Herald*, “New GPS phone system tested on Interstate 880,” Feb. 9, 2008
- *San Mateo County Times*, “GPS-based system would track traffic with phones,” Feb. 9, 2008

- *San Francisco Chronicle*, “Cell phone test to monitor I-880 traffic flow,” Feb. 5, 2008

Other media outlets (selected)

- *Reuters*, “CITRIS: An Incubator of Green Tech Innovation,” May 6, 2009
- *Venture Beat*, “UC Berkeley’s CITRIS lab: a haven for startups trying to solve big problems”, May 6, 2009, by Dean Takahashi
- *Nokia Open Innovation Newsletter*, “Open Threads,” April 2009
- *IEEE*, “Intelligent Transportation Systems, Cell Phone Enhancements Improve Mass Transit,” Feb. 23, 2009
- *IEEE Spectrum*, “Cell Phones for Science,” February 2009, by Prachi Patel-Predd
- *The Industry Standard*, “Researchers use your cellphone to provide real-time traffic information,” Jan. 27, 2009, by Sindya Bhanoo
- *The Journal*, “Comment: Information must be protected,” Dec. 18, 2008, by Maitland Hyslop
- *Excelsior*, “Ring, trafico al habla,” Dec. 10, 2008, by Carlos Fernandez de Lara
- *CITRIS Report*, “Taming Traffic with Your Phone: The Mobile Millennium Project”, Dec. 08, 2008, by Gordy Slack
- *NewsBITS*, “Berkeley Researchers’ High Profile at the 15th annual ITS World Congress in NYC,” Winter 2008, by Ann Brody-Guy
- *Cal Neighbors*, “Bay Area drivers can use cell phones to avoid traffic snarls,” Fall 2008
- *CEE @ Berkeley Connections*, “Mobile Millennium Poised to Expand Bay Area’s Reputation as High-tech leader,” Fall 2008,
- *ARS Technica*, “Nokia collaboration may keep you out of traffic jams,” Nov. 23, 2008, by David Chartier
- *Venture Beat*, “Nokia researchers show off the mobile experiences of the future,” Nov. 20, 2008, by Dean Takahashi
- *US News & World Report*, “Volunteer to Have Your Driving Habits Tracked, Help Reduce Traffic,” Nov. 19, 2008
- *Daily News Online*, “NAVTEQ dials into new traffic monitoring data,” Nov. 18, 2008
- *Wi-Fi Cell Phones*, “Mobile Millennium- GPS Traffic Mapping,” Nov. 18, 2008
- *This Week in Consumer Electronics -TWICE*, “Navteq/Nokia Offer Advanced Traffic Updates,” Nov. 17, 2008, by Amy Gilroy
- *GNT*, “Mobile Millennium: Nokia teste l’info trafic par mobile GPS,” Nov. 14, 2008, by C. Bruno
- *SDA Asia*, “Nokia Research Center puts Mobile Millennium to Curb Traffic Congestion,” Nov. 13, 2008
- *ZD Net*, “Nokia working to reduce traffic congestion,” Nov. 12, 2008, by Matthew Miller
- *Newsfactor.com*, “New Software Turns Cell Phones into Traffic Trackers,” Nov. 12, 2008
- *MSNBC*, “GPS’li telefonar trafik bilgisi olusturacak,” Nov. 12, 2008
- *Mobinaute*, “Nokia utilisera ses mobiles GPS pour eviter les embouteillages,” Nov. 12, 2008
- *The Independent*, “Flu outbreaks and traffic jams,” Nov. 12, 2008
- *Electricpig*, “Nokia launches next-gen traffic studies,” Nov. 12, 2008
- *American Public Media*, “Software empowers cell phones to fight traffic congestion,” Nov. 11, 2008
- *TMCnet*, “Nokia Intro Mobile Millennium to Help Reduce Roadway Traffic Congestion,” Nov. 11, 2008
- *MIT Technology Review*, “Tracking Traffic with Cell Phones: A new project collects traffic data from GPS-enabled cell phones,” Nov. 11, 2008
- *IT Pro*, “Nokia studies traffic with GPS-enabled mobiles,” Nov. 11, 2008
- *Computer Zeitung*, “Pilotprojekt erprobt GPS-basierte Verkehrshcarichten in Echtzeit,” Nov. 11, 2008

- *GPS Business News*, “Nokia, NAVTEQ in large scale trial for traffic information generated by GPS-phones,” Nov. 11, 2008
- *PressDemocrat.com*, “Cell phones can help traffic flow,” Nov. 10, 2008
- *impre.com*, “A olvidarse del caos vial,” Nov. 10, 2008
- *VOIP IP Technology*, “Mobile Millennium Project, GPS and Mobile Phones To Ease Your Commute,” Nov. 10, 2008
- *BlogoWogo*, “Free Traffic Info with Nokia’s Mobile Millennium,” Nov. 10, 2008
- *L’Atelier*, “Les mobiles GPS recréent le trafic routier de San Francisco,” Nov. 10, 2008
- *Cellular-News*, “Using Mobile Phones to Monitor Road Traffic Congestion,” Nov. 10, 2008
- *Computer World*, “Project turns GPS phones into traffic reporters,” Nov. 10, 2008
- *Inside-handy.de*, “Neue Software nutzt Handys mit GPS als Stau-Sensoren,” Nov. 10, 2008
- *Media Post*, “Mobile Program Sends Real-Time Traffic Info,” Nov. 10, 2008
- *New Mobile Tech*, “Mobile Millennium Gives You Traffic Reports, For Free,” Nov. 10, 2008
- *Pocket-lint*, “Nokia Announces Mobile Millennium Project,” Nov. 10, 2008
- *SFist*, “UC Berkeley releases cell phone program to help ease traffic,” Nov. 10, 2008
- *Slash Gear*, “Nokia Mobile Millennium GPS traffic monitoring project seeks volunteers,” Nov. 10, 2008
- *Symbian Freak*, “Large scale public pilot to gather and analyse traffic information using GPS-enabled mobile devices,” Nov. 10, 2008
- *Symbian-guru.com*, “Nokia launches public trial of Mobile Millennium,” Nov. 10, 2008
- *TechRadar.com*, “Nokia’s Mobile Millennium gives free traffic info,” Nov. 10, 2008
- *Telecom Paper*, “Open-source-concurrentie in VS voor TomTom HD Traffic,” Nov. 10, 2008
- *PC Magazine*, “Cell Phones Linked to Track Real-Time Traffic,” Nov. 10, 2008
- *Mobile Messaging 2.0*, “Nokia Launches Mobile Millennium for Traffic Updates,” Nov. 10, 2008
- *mocoNews.net*, “Nokia’s Big Traffic Plans,” Nov. 10, 2008
- *Gizmodo*, “Mobile Millennium Project is a Poor Man’s Traffic Relaying GPS,” Nov. 8, 2008
- *Dr. Dobb’s Portal*, “Turning Mobile Phones into Traffic Cops,” Nov. 7, 2008
- *Engadget*, “Mobile Millennium Project promises to track traffic with cellphones,” Nov. 7, 2008
- *PC World*, “Camera Phones and GPS Are for SMBs Too, Says Startup,” Nov. 7, 2008
- *RoadFlares.org*, “Mobile Millennium,” Nov. 7, 2008
- *Slashdot*, “Project Turns GPS Phones into Traffic Reporters,” Nov. 7, 2008
- *TransID*, “The Mobile Millennium project: GPS et informations trafic!,” Nov. 7, 2008
- *Zimbio*, “Mobile Millennium project promises to track traffic with cellphones,” Nov. 7, 2008
- *GPS World*, “NorCal GPS Cell Phone Traffic Probe Project Gets Underway,” Nov. 7, 2008
- *CITRIS News*, “UC Berkeley and Nokia turn mobile phones into traffic probes with launch of pilot traffic-monitoring software,” Nov. 6, 2008
- *PhysOrg.com*, “UC Berkeley, Nokia turn mobile phones into traffic probes,” Nov. 6, 2008
- *UC Berkeley Newsroom*, “UC Berkeley and Nokia turn mobile phones into traffic probes with launch of pilot traffic-monitoring software,” Nov. 6, 2008
- *CITRIS News*, “Intelligent Infrastructure: Public Service, Safety, and Security: Floating and Cellular Sensors,” Jun. 2008
- *MIT Technology Review*, “New GPS Software,” May 16, 2008
- *PR Web*, “Mobile Sensing- Lagrangian Sensor project receives Clean Tech Innovation prize,” Apr. 22, 2008
- *GPS Daily*, “Nokia and UC Berkeley capture real-time traffic information,” Feb. 12, 2008
- *TechGadgets.in*, “N95 phone gives real-time traffic info, thanks to Nokia and UC researchers,” Feb. 12, 2008
- *Dr. Dobb’s Portal*, “Cars and cell phones: maybe they’re not so bad after all,” Feb. 11, 2008
- *Largest Companies*, “Nokia & UC Berkeley capture real-time traffic info using GPS-enabled cell phones,” Feb. 11, 2008

- *Dvice*, “Nokia phone will steer you around traffic better than your fancy GPS system,” Feb. 11, 2008
- *CITRIS*, “Joint research project to capture traffic data,” Feb. 11, 2008
- *PhysOrg*, “New research project captures traffic data using GPS-enabled cell phones,” Feb. 10, 2008
- *Machines Like Us*, “Capturing traffic data using GPS-enabled cell phones,” Feb. 10, 2008
- *TechShout.com*, “Nokia and UC Berkeley experts build technology to offer real time traffic information,” Feb. 9, 2008
- *eFluxMedia*, “Nokia and UC Berkeley tests GPS phones as traffic sensors,” Feb. 9, 2008
- *Engadget*, “Nokia trial turns N95s into traffic sensing tools,” Feb. 9, 2008
- *Gizmodo*, “Nokia GPS phones to fight the traffic plague,” Feb. 9, 2008
- *Symbian Web Blog*, “Interesting GPS experiment by Nokia and UC Berkeley,” Feb. 9, 2008
- *eNews 2.0*, “Nokia tests a traffic-tracking service,” Feb. 9, 2008
- *Inside Bay Area*, “Area study tracks cell phones on highways to monitor traffic,” Feb. 9, 2008
- *Inside Bay Area*, “GPS phone system tested by students,” Feb. 9, 2008
- *TradingMarkets.com*, “Researchers test real-time traffic,” Feb. 9, 2008
- *Nokia Phone Blog*, “Nokia conducts real time traffic test,” Feb. 9, 2008
- *MobileTor.com*, “Nokia, UC researchers capture real-time traffic info using N95 handset,” Feb. 9, 2008
- *HardOCP*, “The Next Traffic Sensor is Your Phone,” Feb. 9, 2008
- *CanadaNOW*, “GPS Phones Used to Monitor Traffic,” Feb. 9, 2008
- *Reuters*, “Nokia and UC Berkeley capture real-time traffic information using GPS enabled mobile devices,” Feb. 8, 2008
- *The Tech Generation Daily*, “Nokia tracks traffic info with gang of GPS feeds,” Feb. 8, 2008
- *My Digital Life*, “Trend of having GPS enabled cell phones for traffic monitoring,” Feb. 8, 2008
- *IntoMobile*, “Mobile Century uses Nokia N95 as mobile GPS sensor,” Feb. 8, 2008
- *Inside Bay Area*, “Profs test tracking GPS phone to gauge traffic,” Feb. 8, 2008
- *Wireless and Mobile News*, “UCB & Nokia Test GPS for Traffic Flow and Monitoring,” Feb. 8, 2008
- *MobilEdia*, “Nokia and UC Berkeley Monitors Highway Traffic,” Feb. 8, 2008
- *MobiFrance*, “Interview avec Alexandre Bayen, chercheur et Professeur Francais at l’universite de Berkeley en Californie,” Feb. 4, 2008
- *Slashdot*, “Cellphones to Monitor Highway Traffic,” Feb. 3, 2008
- *ZD Net*, “Cell phones to monitor highway traffic,” Feb. 1, 2008

TALKS

Plenary speaker

1. *ARM TechCon*³, Santa Clara Convention Center, October 21, 2009
The focus of the *ARM TechCon*³ is on MCU and tools, internet everywhere and energy efficiency. It gathers more than 2,000 people every year.

Invited speaker

1. *CTS-HYCON Workshop on nonlinear and hybrid control*, La Sorbonne University, Paris, France, July 12, 2006. Invited by the Conference Chair, Professor Françoise Lamnabhi-Larrigue. “Hybrid control of distributed parameter systems”.

2. *Workshop on Abstractions and Robustness*, University of Pennsylvania, Philadelphia, PA, March 29, 2004. Invited by the Workshop Organizer, Professor Eric Feron. “PDE control using viability and reachability analysis”.
3. *Journées sur les systèmes hybrides*, Institut Henri Poincaré, Paris, France, June 27, 2002. Invited by the Conference Chair, Professor Jean-Pierre Aubin, Université Paris Dauphine. “Computational methods for hybrid systems, application to the National Airspace System”.

Invited seminars

1. *University of California Los Angeles (UCLA), Department of Electrical Engineering, Center for Embedded Networked Sensing Seminar*, UCLA, CA, June 19th, 2009. Host: Professor Per Deborah Estrin. “Mobile Millennium” using cell phones to monitor traffic”.
2. *California Institute of Technology, Control and Dynamical Systems seminar*, Pasadena, CA, June 18th, 2009. Host: Professor Jerry Marsden. “Mobile Millennium” using cell phones to monitor traffic”.
3. *Princeton University, Department of Mechanical and Aerospace Engineering, Controls Seminar*, Princeton, NJ, June 16th, 2009. Host: Professor Naomi Leonard. “Mobile Millennium” using cell phones to monitor traffic”.
4. *Stanford University, Department of Aeronautics and Astronautics, Controls Seminar*, Stanford, CA, May 20th, 2009. Host: Professor Per Enge. “Mobile Millennium” using cell phones to monitor traffic”.
5. *Microsoft Research Symposium*, Seattle, WA, May 14th, 2009. Host: Dr. Eric Horvitz. “Mobile Millennium: using cell phones to monitor traffic”.
6. *University of California, Davis, Civil and Environmental Engineering Department, Transportation Seminar*, Davis, CA, April 10th, 2009. Host: Professor Michael Zhang. “Mobile Millennium: using cell phones to monitor traffic”.
7. *Eidgenössische Technische Hochschule Zurich (ETHZ), Electrical Engineering Department*, Zurich, Switzerland, March 24th, 2009. Host: Professor Manfred Morari. “Mobile Millennium: using cell phones to monitor traffic”.
8. *University of Illinois at Urbana Champaign, Electrical Engineering Department, Coordinated Science Laboratory*, Urbana-Champaign, IL, March 18th, 2009. Host: Professor Daniel Liberzon. “Mobile Millennium: using cell phones to monitor traffic”.
9. *Georgia Institute of Technology, Decision and Control Laboratory*, Atlanta, GA, March 13th, 2009. Host: Professor Eric Feron. “Mobile Millennium: using cell phones to monitor traffic”.
10. *University of Pennsylvania, Electrical Engineering Department, Robotics Seminar*, Philadelphia, PA, March 5th, 2009. Host: Professor George Pappas. “Mobile Millennium: using cell phones to monitor traffic”.
11. *UC Berkeley, Mathematics Department, Applied Mathematics Seminar*, Berkeley, CA, February 20th, 2009. Host: Professor Jon Wilkening. “Construction of lower semi continuous solutions to the Hamilton-Jacobi equation with internal boundary conditions: application to highway traffic monitoring”.

12. *UCSD, Mechanical and Aerospace Engineering Department, Control Seminar*, La Jolla, CA, February 13th, 2009. Host: Professor Miroslav Krstic. "Mobile Millennium: using cell phones to monitor traffic".
13. *UC Berkeley, EECS-CEE-ME, Control Seminar* Berkeley, CA, February 27th, 2009. Host: Professor Ruzena Bajcsy. "Mobile Millennium: using cell phones to monitor traffic".
14. *Northwestern University, Civil Engineering, Transportation Seminar*, Evanston, IL, December 4th, 2008. Host: Professor Marco Nie. "Mobile Millennium: using cell phones to monitor traffic".
15. *UC Berkeley, CITRIS Research Exchange*, UC Berkeley, CA, April 16th, 2008. Host: Professor Paul Wright. "Integrating Motion into Infrastructure using Cell Phones".
16. *UC Berkeley, CITRIS - ITS seminar*, UC Berkeley, CA, February 8th, 2008. Host: Professor Paul Wright. "Mobile century: using GPS mobile phones as traffic sensors".
17. *UC Berkeley, CEE Department, ITS seminar*, UC Berkeley, CA, December 14th, 2007. Host: Professor Mark Hansen. "Travel time estimation using probe vehicle data: the Nokia N95 experience".
18. *UC Berkeley, Mathematics Department, Applied Math Seminar*, UC Berkeley, CA, November 29, 2006. Host: Professor John Willkenning. "Control, estimation and simulation of dynamical systems using viability theory".
19. *UC Berkeley, CEE Department, ITS Seminar*. September 1, 2006. Host: Professor Mark Hansen. "Network-based TFM optimization algorithms for aggregate flow models of the NAS".
20. *NASA AFC Air Traffic Management Seminar*. NASA Ames, Moffett Field, CA, July 31, 2006. Host: Dr. Banavar Sridhar. "Network-based TFM optimization algorithms for aggregate flow models of the NAS".
21. *University of Illinois at Urbana Champaign, Department of Aeronautics and Astronautics, Aerospace Seminar*. February 6, 2006. Host: Professor Natasha Neogi. "Approximation algorithms for arrival sequencing in congested airspaces".
22. *UC Berkeley, IEOR Department, IEOR Seminar*. September 26, 2005. Host: Professor Max Shen. "Approximation Algorithms for Arrival Sequencing in Congested Airspaces".
23. *UC Berkeley, CEE Department, ITS Seminar*. April 15, 2005. Host: Professor Mark Hansen. "Control of PDE Networks Via Adjoint-based Optimization: application to highways and air traffic control".
24. *Ecole des Mines de Paris Seminar, Centre d'Automatique et des Systèmes (CAS), Control Seminar*. Fontainebleau, France, March 8, 2004. Host: Professor Nicolas Petit. "Adjoint-based constrained control of Eulerian models of transportation networks".
25. *Institut Henri Poincaré, Viability Seminar*. Paris, France, March 2, 2004. Host: Professor Jean-Pierre Aubin, Université Paris Dauphine. "Adjoint-based constrained control of Eulerian models of transportation networks".
26. *Stanford University, Department of Aeronautics and Astronautics, AA297 Seminar in Guidance and Control*. Stanford, CA, October 1, 2003. Host: Professor Steven Rock. "Computational control of networks of dynamical systems: application to the National Airspace System".

27. *UC Berkeley, EECS Department, CHES Seminar.* Berkeley, CA, October 7, 2003. Host: Professor Shankar Sastry. “Computational control of networks of dynamical systems: application to the National Airspace System”.
28. *UC Berkeley, EECS Department, CHES Seminar.* Berkeley, CA, April 29, 2003. Host: Professor Shankar Sastry. “A short introduction to Viability Theory”.
29. *Stanford University, Mechanical Engineering Department, Mechanical Engineering Seminar.* Stanford, CA, April 22, 2003. Host: Professor Fritz Prinz. “Computational control of networks of dynamical systems”.
30. *NASA AFC Air Traffic Management Seminar.* NASA Ames, Moffett Field, CA, March 17, 2003. Host: Dr. Banavar Sridhar. “Computational control of networks of dynamical systems”.
31. *Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, ICAT Seminar.* Cambridge, MA, April 9, 2003. Host: Professor Eric Feron. “Computational control of networks of dynamical systems”.
32. *Stanford University, CS Department, CS-theory lunch Seminar.* Stanford, CA, April 3, 2003. Host: Professor Mihalis Yannakakis. “Computational control of networks of dynamical systems”.
33. *Stanford University, MS&E Department, SOL Seminar.* Stanford, CA, April 2, 2003. Host: Professor Yinyu Ye. “Computational control of networks of dynamical systems”.
34. *NASA AFC Air Traffic Management Seminar.* NASA Ames, Moffett Field, October 21, 2002. Host: Dr. Banavar Sridhar. “MILP solutions for partial automation of congested airspaces in arrival areas”.
35. *Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, ICAT Seminar.* Cambridge, MA, September 26, 2002. Host: Professor Eric Feron. “Mathematical and computational tools for hierarchical control of hybrid systems: application to the NAS”.
36. *NASA Air Traffic Management Seminar.* NASA Ames, Moffett Field, CA, July 29, 2002. Host: Dr. George Meyer. “Delay predictive models for sector-based air traffic flow”.
37. *University of Pennsylvania, EE Department, GRASP Seminar.* Philadelphia, PA, June 14, 2002. Host: Professor George Pappas. “Computational methods for hybrid systems, application to the National Airspace System”.

Industry and government talks

1. *Energy Efficiency; Cyber-Physical Systems; Medical Devices & Systems,* Siemens Corporate Headquarters, Munich, Germany, May 28th, 2009. “Mobile Phones as Sensors for Improved Energy Efficiency”.
2. *Siemens – Berkeley Day,* Siemens Corporate Headquarters, Munich, Germany, May 27th, 2009. “Mobile Phones as Sensors for Improved Energy Efficiency”.
3. *VOLVO Centers of Excellence Symposium,* Gothenborg, Sweden, April 19th, 2009. “Mobile Millennium: using cell phones to monitor traffic”.
4. *South Bay Traffic Officials Association (SBTOA),* San Jose, CA, March 10th, 2009. “Mobile Millennium: using cell phones to monitor traffic”.

5. *Ministere des Transports – California DOT meeting*, Richmond, CA, January 23, 2008. “Mobile Millennium: using cell phones to monitor traffic”.
6. *NAVTEQ*, Chicago, IL, December 4th, 2008. “Mobile Millennium: using cell phones to monitor traffic”.
7. *California DOT meeting*, “Mobile Millennium: using cell phones to monitor traffic”, Richmond Field Station, CA, August 12, 2008.
8. *ITS Board of Directors meeting*, “Mobile Millennium: using cell phones to monitor traffic”, Richmond Field Station, CA, August 6, 2008.
9. *Department of Water Resources*, “Lagrangian drifter technology for monitoring the Sacramento Delta”, Sacramento, CA, July 25, 2008.
10. *Boeing-Berkeley meeting*, “Aggregate traffic flow models for the en route airspace”, UC Berkeley, July 15th, 2008.
11. *NAVTEQ Traffic Symposium*, “Mobile Millennium: using GPS to reconstruct traffic”, New York, NY. November 17th, 2008
12. *Federal DOT, California DOT (Caltrans)*, Sacramento, CA, June 16, 2007. “Mobile Millennium kick off”.
13. *Siemens confidential briefing*, UC Berkeley, CA, April 9, 2008. “Sensors for the aquatic environment”.
14. *Federal DOT, California DOT (Caltrans)*, Richmond Field Station, CA, June 12, 2007. “Mobile Century Results”.
15. *Nokia Research Center*, Palo Alto, CA, June 11, 2007. “Mobile Millennium”.
16. *Siemens strategic visit*, UC Berkeley, CA, April 9, 2008. “Mobility tracking in large scale physical systems”.
17. *Nokia Research Center*, Palo Alto, CA, November 15, 2007. “Real time traffic monitoring from GPS phones”.
18. *California DOT (Caltrans)*, Sacramento, CA February 2, 2007. “Optimal sensor requirements for corridor instrumentation guidelines”.
19. *NSF - NITRD Workshop*, Alexandria, VA, October 5, 2006. “NAS-wide traffic modeling software for traffic flow management High Confidence Software and Systems”.
20. *Sensis corporation*, Campbell, CA, May 15, 2006. “Development of decision support tools for air traffic management”.
21. *SAGEM*, Le Ponant de Paris, France, December 9, 2004. “Interactions between defense industry and academia”.
22. *NASA Joint University Program Meeting*, UCLA, Los Angeles, CA, September 26, 2003. “Adjoint-based constrained control of Eulerian network models of the National Airspace System”.
23. *Boeing - DARPA SEC Meeting*, Stanford University, CA, April 15, 2003. “Conflict avoidance using differential games: application to high altitude traffic”.

24. *Ambassade de France (French Embassy)*, Washington D.C., June 13, 2002. “Computational methods for hybrid systems, application to multivehicle systems”.
25. *43th Aeronautics and Astronautics Industrial Affiliates Meeting*, Stanford University, CA April 23, 2002. “Delay predictive models of the National Airspace System”.
26. *DARPA Meeting*, Stanford University, CA, March 11, 2002. “Design of network maneuvers and actuation policies for the National Airspace System”.
27. *Dassault-Falconjet*, Saint-Cloud France, May 16, 2001. “Reachability computations for predictive models of dynamical systems and the National Airspace System”.

Talks at workshops, conferences, or meetings

1. *CalDay College of Engineering Speaker*, UC Berkeley, Berkeley, CA, April 18th, 2009. “Mobile Millennium: using GPS to reconstruct traffic”.
2. *15th World Congress on ITS*, Safe trip 21 session, New York, NY, November 18th, 2008, “Mobile Millennium: using GPS to reconstruct traffic”.
3. *SUPERB seminar*, UC Berkeley, Berkeley, CA, July 3rd, 2008. “Mobile Millennium: using GPS to reconstruct traffic”.
4. *CalDay*, UC Berkeley, Berkeley, CA, April 11th, 2008. “Mobile Century Traffic Project: GPS in your cell phone”.
5. *Vincent Lo & Shanghai – CITRIS*, UC Berkeley, Berkeley, CA, November 14th, 2007. “Large scale infrastructure systems monitoring using cellular phones”.
6. *Nokia delegation meeting – CITRIS*, UC Berkeley, Berkeley, CA, November 7th, 2007. “Large scale infrastructure systems monitoring using cellular phones”.
7. *CITRIS - Tekes meeting*, UC Berkeley, Berkeley, CA, October 1, 2007 . “Large scale infrastructure monitoring using mobile sensor networks”.
8. *National Airspace System Performance Workshop*. Asilomar, Pacific Grove, CA, September 6, 2007. “Network based optimization for TFM aggregate flow models”.
9. *HSCC 2007 satellite Workshop on modeling and control of physical networks*, Pisa, Italy, April 6, 2007. “Modeling and analysis of single flagellum bacterial motion”.
10. *CEE Advisory Council*, UC Berkeley, CA, May 3, 2007. “Control and optimization of large scale infrastructure systems”.
11. *NASA NGATS ATM airspace project first technical interchange Meeting*, NASA Ames, Moffett Field, CA, March 20, 2007. “A unified approach to strategic traffic flow models and performance evaluation for traffic flow management”.
12. *Transportation Research Board, Innovation in Air Traffic Management Workshop (TRB)*, Washington, DC, Jan. 21, 2007. “Fundamental research in Traffic Flow Management”.
13. *Optimization and Software in Air Traffic Management Tutorial Session*, part of the *45th IEEE Conference on Decision and Control*, San Diego, CA, December 12, 2006. “Linear Eulerian model of En-Route air traffic flow”; “The Berkeley Eulerian Toolbox Modeling”.

14. *National Airspace System Performance Workshop*. Asilomar, Pacific Grove, CA, Mar. 16, 2006. “Towards a scientific basis for determining En Route capacity”.
15. *44th IEEE Conference on Decision and control and European Control Conference*. Sevilla, Spain, December 14, 2005 “A viability approach to Hamilton-Jacobi equations: application to concave highway traffic flux functions”.
16. *NSF CDATM Meeting*. University of Illinois at Urbana Champaign, Urbana, IL, December 1, 2005. “Distributed Air Traffic Management: Control and Optimization”.
17. *FAA-NEXTOR Meeting*. UC Berkeley, Berkeley, CA, July 20, 2005. “Strategic traffic flow models based on data-mining and system-identification techniques”.
18. *American Control Conference*. Portland, OR, June 10, 2005. “Computation and control of solutions to the Burgers Equation using viability theory”.
19. *C3UV Seminar, CCIT*, UC Berkeley, Berkeley, CA, April 18, 2005. “Reachability and viability analysis for navigation in the presence of stereo vision errors”.
20. *43rd IEEE Conference on Decision and Control*. Paradise Island, Nassau, Bahamas, December 16, 2004. “An approximation algorithm for scheduling aircraft with holding time”.
21. *AIAA Conference on Guidance Control and Dynamics*. Providence, RI, August 18, 2004. “Optimal arrival traffic spacing via dynamic programming”.
22. *American Control Conference*. Boston, MA, July 2, 2004. “Eulerian network model of Air Traffic Flow in congested areas”.
23. *American Control Conference*. Boston, MA, July 2, 2004. “Adjoint based constrained control of Eulerian transportation networks: application to Air Traffic Control”.
24. *7th International Workshop Hybrid Systems Computation and Control*. University of Pennsylvania, Philadelphia, March 25, 2004. “Network congestion alleviation using adjoint hybrid control: applications to highways”.
25. *42nd IEEE Conference on Decision and Control*. Maui, Hawaii, December 12, 2003. “MILP formulation and polynomial time algorithm for an aircraft scheduling problem”.
26. *2003 ETHZ-UCB-Stanford Workshop*, Stanford, CA, December 5, 2003. “MILP formulation and polynomial time algorithm for an aircraft scheduling problem”.
27. *AIAA Conference on Guidance Control and Dynamics*, Austin TX, August. 11, 2003. “A differential game formulation of alert levels in ETMS data”.
28. *American Control Conference*. Denver, CO, June 6, 2003. “Real-time control law synthesis for hybrid systems using MILP: application to congested airspace”.
29. *41st IEEE Conference on Decision and Control*. Las Vegas, NV, December 13, 2002. “Conditional viability for impulse differential games”.
30. *41st IEEE Conference on Decision and Control*. Las Vegas, NV, December 13, 2002. “Viability Kernels and Capture Basins of Sets under Differential Inclusions”.
31. *AIAA Conference on Guidance Navigation and Control*. Monterey, CA, August 8, 2002. “A control theoretic predictive model for sector-based traffic flow”.

32. *American Control Conference*. Anchorage, AK, May 8, 2002. “Delay predictive models of the National Airspace System using hybrid control theory”.
33. *5th International Workshop Hybrid Systems Computation and Control*. Stanford, CA, March 25, 2002. “Guaranteed overapproximations of unsafe sets for continuous and hybrid systems”.
34. *40th IEEE Conference on Decision and Control*. Orlando, FL, December 5, 2001. “A construction procedure using characteristics for viscosity solutions of the Hamilton-Jacobi equation”.
35. *4th International Workshop Hybrid Systems Computation and Control*. Rome, Italy, March 29, 2001. “Validating a Hamilton-Jacobi approximation to hybrid system reachable sets”.