

# Andrew Tinka

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Electrical Engineering and Computer Sciences,  
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## Education

- **UC Berkeley**, Berkeley, California since Aug. 2008  
Ph.D. Electrical Engineering and Computer Sciences (expected completion May 2012)  
Control, Intelligent Systems, and Robotics
- **UC Berkeley**, Berkeley, California Aug. 2006 – May 2008  
M.S. Civil and Environmental Engineering  
Systems Engineering
- **University of British Columbia**, Vancouver, BC, Canada Sep. 1996 – May 2002  
B.A.Sc. Engineering Physics  
Electrical Engineering specialization; Honors Mathematics option

## Awards and Honors

- *Post-Graduate Scholarship*, Natural Sciences and Engineering Research Council of Canada 2009 – 2012
- *Outstanding GSI Award*, EE 42/100, UC Berkeley May 2011
- *Top 10 Innovators in Water*, NASA LAUNCH sustainability forum Mar. 2010
- *Non-resident Tuition Award*, Dept. of Civil and Environmental Engineering, UC Berkeley Jan. 2009
- *Finalist, Clean Tech Innovation Prize*, Center for Entrepreneurship and Technology May 2008
- *Outstanding GSI Award*, CE 191, UC Berkeley May 2007
- *Hugh M. Brock National Entrance Scholarship*, University of British Columbia Sep. 1996 – May 2000

## Research Interests

- *Mobile Sensor Networks*
  - ◇ Design and implementation of novel sensor systems,
  - ◇ Network protocol design for mobile sensors,
  - ◇ Robotics for sensor networks.
- *Data assimilation*
  - ◇ Computationally efficient formulations of data assimilation problems,
  - ◇ Assimilation into Partial Differential Equation-driven models,
  - ◇ Distributed data assimilation.
- *Multi-vehicle control*
  - ◇ Decentralized control and planning for multiple vehicles,
  - ◇ Hamilton-Jacobi partial differential equations for optimal control,
  - ◇ Sensor coverage as placement objective.
- *Decentralized computation*
  - ◇ Design of decentralized algorithms for optimization,
  - ◇ Networking for decentralized computation.

## Research Experience

- *Graduate Student Researcher* since Aug. 2006  
UC Berkeley (advisor: A. Bayen)  
Design and development of the Floating Sensor Network; control and data assimilation techniques for multi-vehicle sensing in river environments.

## Teaching Experience

- *Graduate Student Instructor* Aug. 2011 – Dec. 2011  
UC Berkeley, EE 128/ME 134, Feedback Control (Instructor: R. Fearing)
- *Graduate Student Instructor* Aug. 2010 – Dec. 2010  
UC Berkeley, EE 42/100, Electronic Techniques for Engineering (Instructor: A. Niknejad)
- *Graduate Student Instructor* Aug. 2006 – Dec. 2006  
UC Berkeley, CE 191, Systems Analysis for Civil Engineers (Instructor: A. Bayen)

## Industry Experience

- *Embedded Systems Engineer* Jan. 2006 – Aug. 2006  
Center for Collaborative Control of Unmanned Vehicles, UC Berkeley  
Embedded system design: a PC/104+, Pentium-M stack, hardened for UAV operations; Printed Circuit Board and Flat Flex Cable assembly design; led the construction and maintenance of a fleet of six UAVs; Flight Manager for UAV operations: logistics, safety, flight operations.
- *Embedded Systems Engineer* Jul. 2003 – Dec. 2005  
Powis Parker, Inc., Berkeley, USA  
Firmware development for office machinery: heater control, motor control, sensor processing, communications, user interface; Printed Circuit Board assembly design.
- *Product Development Engineer* Jun. 2002 – Mar. 2003  
POSH Manufacturing, Richmond, Canada  
Firmware development for magnetic card swipe devices; circuit review and debugging for magnetic card devices, keypad/LCD interfaces, and networked access control devices; feasibility studies for new Point of Sale products.

## Publications

### Journal articles

1. **Andrew Tinka**, Mohammad Rafiee, and Alexandre M. Bayen, “Floating sensor networks for river studies”, *IEEE Systems Journal*, accepted Nov. 2011.
2. **Andrew Tinka**, Thomas Watteyne, Kristofer S. J. Pister, and Alexandre M. Bayen, “A decentralized scheduling algorithm for time synchronized channel hopping”, *ICST Transactions on Mobile Communications and Applications*, 11(7–9), Sep. 2011. doi:10.4108/icst.trans.mca.2011.e5
3. **Andrew Tinka**, Issam Strub, Qingfang Wu, and Alexandre M. Bayen, “Quadratic programming based data assimilation with passive drifting sensors for shallow water flows”, *International Journal of Control*, 83(6), pp. 1686–1700, Aug. 2010. doi:10.1080/00207179.2010.489621

### Refereed conference publications

1. Mohammad Rafiee, **Andrew Tinka**, Jerome Thai, and Alexandre M. Bayen, “Combined state-parameter estimation for shallow water equations”, *Proceedings of the American Control Conference*, San Francisco, USA, Jun. 2011.
2. Kevin Weekly, Leah Anderson, **Andrew Tinka**, and Alexandre M. Bayen, “Autonomous river navigation using the Hamilton-Jacobi framework for underactuated vehicles”, *Proceedings of the IEEE International Conference on Robotics and Automation*, Shanghai, P.R. China, May 2011. doi:10.1109/ICRA.2011.5980388
3. **Andrew Tinka**, Thomas Watteyne, and Kris Pister, “A decentralized scheduling algorithm for time synchronized channel hopping”, *Proceedings of the Second International Conference on Ad Hoc Networks*, Victoria, Canada, Aug. 2011. doi:10.1007/978-3-642-17994-5\_14
4. **Andrew Tinka**, Issam Strub, Qingfang Wu, and Alexandre M. Bayen, “Quadratic programming based data assimilation with passive drifting sensors for shallow water flows”, *Proceedings of the Joint 48<sup>th</sup> IEEE Conference on Decision and Control and 28<sup>th</sup> Chinese Control Conference*, Shanghai, P.R. China, Dec. 2009. doi:10.1109/CDC.2009.5399663
5. Qingfang Wu, Mohammad Rafiee, **Andrew Tinka**, and Alexandre M. Bayen, “Inverse modeling for open boundary conditions in channel network”, *Proceedings of the Joint 48<sup>th</sup> IEEE Conference on Decision and Control and 28<sup>th</sup> Chinese Control Conference*, Shanghai, P.R. China, Dec. 2009. doi:10.1109/CDC.2009.5400445
6. **Andrew Tinka**, Sébastien Diemer, Luis Madureira, Eduardo R.B. Marques, João Borges de Sousa, Ricardo Martins, José Pinto, Jorge Estrela da Silva, Alexandre Sousa, Patrick Saint-Pierre, and Alexandre M. Bayen, “Viability-based computation of spatially constrained minimum time trajectories for an autonomous underwater vehicle: implementation and experiments”, *Proceedings of the American Control Conference*, St. Louis, USA, Jul. 2009. doi:10.1109/ACC.2009.5160166

7. Olli-Pekka Tossavainen, Julie Percelay, **Andrew Tinka**, Qingfang Wu, and Alexandre M. Bayen, “Ensemble Kalman Filter based state estimation in 2D shallow water equations using Lagrangian sensing and state augmentation”, *Proceedings of the 47<sup>th</sup> IEEE Conference on Decision and Control*, Cancun, Mexico, Dec. 2008. doi:10.1109/CDC.2008.4738999
8. Sivakumar Rathinam, Pedro Almeida, ZuWhan Kim, Steven Jackson, **Andrew Tinka**, William Grossman, and Raja Sengupta, “Autonomous Searching and Tracking of a River using an UAV”, *Proceedings of the American Control Conference*, New York, Jul. 2007. doi:10.1109/ACC.2007.4282475

## Talks and presentations

### Invited talks and seminars

1. “Distributed assignment problems”, *Advanced Special Topics in Civil and Environmental Engineering (CE 290)*, UC Berkeley, Nov. 8, 2010.
2. “Floating sensor network: new sensing capabilities for estuaries and rivers”, *NASA LAUNCH sustainability forum*, Kennedy Space Center, USA, Mar. 16, 2010.
3. “Mobile Floating Sensor Network Placement using the Saint-Venant 1D Equation”, *Robotics and Embedded Systems Seminar*, UC Berkeley, Nov. 24, 2009.
4. “Lagrangian drifter project overview”, *University of Porto*, Porto, Portugal, Jun. 8, 2009.
5. “Viability theory and algorithms for Autonomous Water Vehicles”, *HYCON-EECI Graduate School on Control (guest lecture)*, Jan. 15, 2009.
6. “Active Lagrangian Sensors”, *Vehicle Dynamics Seminar*, UC Berkeley, Oct. 22, 2008.
7. “Lagrangian Sensors in the Sacramento/San Joaquin Delta”, *University of Washington*, Seattle, USA, Jun. 16, 2008.

### Conference and workshop presentations

1. “A decentralized scheduling algorithm for time synchronized channel hopping”, *Second International Conference on Ad Hoc Networks*, Victoria, Canada, Aug. 19, 2010.
2. “Mobile Millenium”, *ICRA10 Workshop on Robotics and Intelligent Transportation System*, Anchorage, USA, May 7, 2010.
3. “Quadratic programming based data assimilation with passive drifting sensors for shallow water flows”, *Joint 48<sup>th</sup> IEEE Conference on Decision and Control and 28<sup>th</sup> Chinese Control Conference*, Shanghai, P.R. China, Dec. 18, 2009.
4. “Inverse modeling for open boundary conditions in channel network”, *Joint 48<sup>th</sup> IEEE Conference on Decision and Control and 28<sup>th</sup> Chinese Control Conference*, Shanghai, P.R. China, Dec. 18, 2009.
5. “Real-time Estimation of Flow States in Open Channels via Lagrangian Sensing”, *Joint 48<sup>th</sup> IEEE Conference on Decision and Control and 28<sup>th</sup> Chinese Control Conference*, Shanghai, P.R. China, Dec. 18, 2009.
6. “Viability-based computation of spatially constrained minimum time trajectories for an autonomous underwater vehicle: implementation and experiments”, *American Control Conference*, St. Louis, USA, Jun. 11, 2009.
7. “Ensemble Kalman Filter based state estimation in 2D shallow water equations using Lagrangian sensing and state augmentation”, *47<sup>th</sup> IEEE Conference on Decision and Control*, Cancun, Mexico, Dec. 11, 2008.

## Industry talks

1. “Active Floating Sensors”, *IBM Green Innovations meeting*, UC Berkeley, Jan. 27, 2010.
2. “Lagrangian Sensor Network for monitoring in the San Joaquin-Sacramento Delta”, presented at *Groundwater Salinity: a Groundwater Dilemma (Groundwater Resources Association of California conference)*, Sacramento, USA, Mar. 25, 2009.
3. “Active Lagrangian Sensors”, *Claremont Creek Ventures meeting*, UC Berkeley, Oct. 14, 2008.
4. “Lagrangian Sensors in the San Joaquin-Sacramento Delta”, *Boeing-Berkeley meeting*, UC Berkeley, Jul. 16, 2008.
5. “Lagrangian Sensors in the San Joaquin-Sacramento Delta”, *Cemagref meeting*, UC Berkeley, Jul. 8, 2008.
6. “GSM for Telemetry in the San Joaquin Delta”, *Nokia Research Center*, Palo Alto, USA, Jan. 15, 2007.

## Reviewing activities

### Journal Referee

- Networks and Heterogeneous Media 2009

### Conference Referee

- IEEE Vehicular Technology Conference 2011
- IEEE Conference on Decision and Control 2010

## Skills

- Programming languages
  - ◊ C
  - ◊ Python
  - ◊ C++
  - ◊ Java
- Mathematics software
  - ◊ MATLAB
  - ◊ Numpy/Scipy
  - ◊ NetLogo
  - ◊ AMPL/CPLEX
- Embedded systems
  - ◊ Firmware development
  - ◊ Systems integration
  - ◊ Digital circuit design
  - ◊ Printed Circuit Board layout

## Other activities

- UBC Engineering Undergraduate Society
  - ◊ President of the Engineering Undergraduate Society Sep. 2001 – May 2002
  - ◊ Editor of *the nEUSpaper* (monthly student publication) Sep. 2000 – May 2001
  - ◊ President of the Engineering Physics Society Sep. 2000 – May 2001