



[airliec@u.washington.edu](mailto:airliec@u.washington.edu)

## Education

- Ph.D. in Aeronautics & Astronautics, University of Washington (2013)
- M.Sc. in Mathematics, University of Washington (2013)
- M.Eng. in Research, University of Sydney (2008)
- B.Eng. in Aeronautical (Space), University of Sydney (2006)
- B.Sc. in Adv. Mathematics and Physics, University of Sydney (2006)

## Research Interests

- Networked Dynamic Systems
- Multi-agent Systems
- Control Theory
- Graph Theory
- Network Security
- Semi-Autonomous Networks
- Advection on Graphs
- Network Controllability

## Teaching

### [Publications by Research Topics](#)

## Publications List

### Book/Book Chapters

- Airlie Chapman (2015) "Semi-Autonomous Network: Effective Control for Networked Systems through Protocols, Design, and Modeling", Springer. [Book Link](#)
- Airlie Chapman, Eric Schoof and Mehran Mesbahi (2015) "Online Adaptive Network Design for Disturbance Rejection". In Cambridge University Press's Principles of Cyber-Physical Systems. (to appear)
- Airlie Chapman and Mehran Mesbahi (2015) "UAV Swarms: Models and Effective Interfaces", 1987-2019. In Handbook of Unmanned Aerial Vehicles, Springer. [Chapter Link](#)
- Airlie Chapman and Mehran Mesbahi (2013) "Security and Infiltration of Networks: A Structural Controllability and Observability Perspective", 143-160. In Springer's Lecture Notes on Control and Information Sciences 449. [Chapter Link](#)

## Journals

- Eric Schoof, Airlie Chapman and Mehran Mesbahi (2017), "Weighted Bearing-Compass Dynamics: Edge and Leader Selection", Transactions on Network Science and Engineering. (submitted)
- Armand Awad, Airlie Chapman, Eric Schoof, Anshu Narang-Siddarth and Mehran Mesbahi (2017), "Time-Scale Separation in Networks: State-Dependent Graphs and Consensus and Tracking", Transactions on Control of Network Systems. (submitted)
- Andrés D. González, Airlie Chapman, Leonardo Dueñas-Osorio, Mehran Mesbahi and Raissa M. D'Souza (2017), "Efficient Infrastructure Restoration Strategies using the Recovery Operator", Computer-Aided Civil and Infrastructure Engineering. (submitted)
- Jeffrey Emenheiser, Airlie Chapman, Márton Pósfai, James P. Crutchfield, Mehran Mesbahi, and Raissa M. D'Souza (2016) "Patterns of patterns of synchronization: Noise induced switching in rings of reactively coupled nonlinear oscillators", (26) 9:094816. Chaos: An Interdisciplinary Journal of Nonlinear Science.
- Saghar Hosseini, Airlie Chapman, and Mehran Mesbahi (2016) "Online Distributed ADMM on Networks". Automatica. (submitted)
- Saghar Hosseini, Airlie Chapman, and Mehran Mesbahi (2015) "Online Distributed Optimization on Dynamics Networks". IEEE Transactions on Automatics Control. (to appear)
- Airlie Chapman, Marzieh Nabi-Abdolyousefi and Mehran Mesbahi (2014) [Controllability and Observability of Network-of-Networks via Cartesian Products](#), 2668- 2679. IEEE Transactions on Automatic Control 59 (10). [Errata](#)
- Airlie Chapman and Mehran Mesbahi (2013) [Semi-Autonomous Consensus: Network Measures and Adaptive Trees](#), 19-31. IEEE Transactions on Automatic Control 58 (1).
- Airlie Chapman and Mehran Mesbahi (2012) [System Theoretic Aspects of Influenced Consensus: Single Input Case](#), 1505-1511. IEEE Transactions on Automatic Control 57 (6).
- Peter Domachuk, Airlie Chapman, Eric Magi, Michael J. Steel, Hong C. Hguyen, and Benjamin J. Eggleton (2005) "Transverse characterization of high air-fill fraction tapered photonic crystal fiber", 3885-92. In Applied Optics 44 (19).

## Conferences

- Airlie Chapman, and Mehran Mesbahi (2017) "Data-guided Control: Clustering, Graph Products, and Decentralized Control". In Proc. of the IEEE Conference on Decision and Control. (submitted)
- Shima Sadat Mousavi, Airlie Chapman, Mohammad Haeri and Mehran Mesbahi (2017), "Null Space Strong Structural Controllability via Skew Zero Forcing Sets", In Proc. of the IEEE Conference on Decision and Control. (submitted)
- Airlie Chapman, Eric Schoof and Mehran Mesbahi (2016) [Pattern Control for Networks of Ginzburg-Landau Oscillators via Markov Decision Processes](#), 1853-1858. In Proc. of the IEEE Conference on Decision and Control. [Slides](#)
- Airlie Chapman and Mehran Mesbahi (2016) [Multiple Time-Scales in Network-of-Networks](#), 5563-5568. In Proc. of the American Control Conference. [Slides](#)
- Airlie Chapman and Mehran Mesbahi (2015) [State Controllability, Output Controllability and Stabilizability of Networks: A Symmetry Perspective](#), 4776-4781. In Proc. of the IEEE Conference on Decision and Control. (Invited Paper) [Slides](#) [Errata](#)
- Armand Awad, Airlie Chapman, Eric Schoof, Anshu Narang-Siddarth and Mehran Mesbahi (2015) [Time-Scale Separation on Networks: Consensus, Tracking and State-Dependent Interactions](#), 6172-6177. In Proc. of the IEEE Conference on Decision and Control.
- Mathias Hudoba de Badyn, Airlie Chapman and Mehran Mesbahi (2015) [Network Entropy: A System-Theoretic Perspective](#), 5512-5517. In Proc. of the IEEE Conference on Decision and Control.
- Eric Schoof, Airlie Chapman and Mehran Mesbahi (2015) [Efficient Leader Selection for Translation and Scale of a Bearing-Compass Formation](#), 1816-1821. In Proc. of the IEEE International Conference on Robotics and Automation.

- Airlie Chapman and Mehran Mesbahi (2014) [On Symmetry and Controllability of Multi-Agent Systems](#), 626-630. In Proc. of the IEEE Conference on Decision and Control. (Invited Paper)
- Saghar Hosseini, Airlie Chapman and Mehran Mesbahi (2014) [Online Distributed ADMM via Dual Averaging](#), 904-909. In Proc. of the IEEE Conference on Decision and Control. (Invited Paper)
- Airlie Chapman and Mehran Mesbahi (2014) [Kronecker Product of Networked Systems and their Approximates](#), 1426-1431. In 21st International Symposium on Mathematical Theory of Networks and Systems. [Slides](#)
- Eric Schoof, Airlie Chapman and Mehran Mesbahi (2014) [Bearing-Compass Formation Control: A Human-Swarm Interaction Perspective](#), 3881-3886. In Proc. of the American Control Conference. [Slides](#)
- Airlie Chapman, Eric Schoof and Mehran Mesbahi (2013) [Distributed Online Topology Design for Disturbance Rejection](#), 817-821. In Proc. of the IEEE Conference on Decision and Control. [Slides](#)
- Saghar Hosseini, Airlie Chapman and Mehran Mesbahi (2013) [Online Distributed Optimization via Dual Averaging](#), 1484-1489. In Proc. of the IEEE Conference on Decision and Control. [Slides](#)
- Airlie Chapman and Mehran Mesbahi (2013) [On Strong Structural Controllability of Networked Systems: A Constrained Matching Approach](#), 6141-6146. In Proc. of the American Control Conference. [Slides](#)
- Airlie Chapman, Marzieh Nabi-Abdolyousefi and Mehran Mesbahi (2012) [On the Controllability and Observability of Cartesian Product Networks](#), 80-85. In Proc. of the IEEE Conference on Decision and Control. (Invited Paper) [Slides](#)
- Airlie Chapman, Eric Schoof and Mehran Mesbahi (2012) [Advection on Networks with an Application to Decentralized Load Balancing](#), 2680-2681. In Proc. of the IEEE International Conference on Intelligent Robots and Systems.
- Airlie Chapman and Mehran Mesbahi (2012) [Cartesian products on Z-Matrix networks: Factorization and interval analysis](#). In 20th International Symposium on Mathematical Theory of Networks and Systems. [Slides](#)
- Airlie Chapman and Mehran Mesbahi (2012) [Stability Analysis of Nonlinear Networks via M-matrix Theory: Beyond Linear Consensus](#), 6626-6631. In Proc. of the American Control Conference. [Slides](#)
- Airlie Chapman and Mehran Mesbahi (2011) [Advection on Graphs](#), 1461-1466. In Proc. of the IEEE Conference on Decision and Control. [Slides](#)
- Airlie Chapman, Ran Dai and Mehran Mesbahi (2011) [Network Topology Design for UAV Flocking with Wind Gusts](#). In Proc. of the AIAA Guidance, Navigation and Control Conference. [Slides](#)
- Airlie Chapman and Mehran Mesbahi (2011) [UAV Flocking with Wind Gusts: Adaptive Topology and Model Reduction](#), 1045-1050. In Proc. of the American Control Conference. (Best session presentation award) [Slides](#)
- Airlie Chapman and Mehran Mesbahi (2010) [Semi-Autonomous Networks: Network Resilience and Adaptive Trees](#), 7473-7478. In Proc. of the IEEE Conference on Decision and Control. (Invited Paper) [Slides](#)
- Airlie Chapman, Eric Schoof and Mehran Mesbahi (2010) [Semi-Autonomous Networks: Theory and Decentralized Protocols](#), 1958-1963. In Proc. of the IEEE International Conference on Robotics and Automation. [Slides](#)
- Airlie Chapman, Marzieh Nabi-Abdolyousefi and Mehran Mesbahi (2009) [Identification and Infiltration in Consensus-type Networks](#), 84-89. In 1st IFAC Workshop on Estimation and Control of Networked Systems. (Finalist for the best student paper award) [Poster](#)
- Airlie Chapman and Salah Sukkarieh (2009) [A protocol for decentralized multi-vehicle mapping with limited communication connectivity](#), 357-362. In Proc. of the IEEE International Conference on Robotics and Automation.
- Peter Domachuk, Airlie Chapman, Eric Magi, Michael J. Steel, Hong C. Hguyen, and Benjamin J. Eggleton (2005) "Tapered High-Fill Photonic Crystal Fiber", 692-694. In Proc. of the Conference on Lasers & Electro-Optics.

## Invited Talks

- NetSci 2014 School, "A brief introduction to control theory with applications to dynamic networks", Berkeley, 2014. [Slides Code](#)
- Raissa D'Souza's Group, "Semi-Autonomous Networks", UC Davis, 2014.
- Johann Bernoulli Institute for Mathematics and Computer Science, "Effective Control of Networked Systems through Modeling, Interfaces, and Design", University of Groningen, The Netherlands, 2012.
- Large Graph and Networks group, "Effective Control of Networked Systems" University Catholique De Louvain (UCL), 2012.

## Videos

## PhD Documents

- Dissertation: Semi-Autonomous Networks: Effective Control of Networked Systems through Protocols, Design and Modeling
  - [Report](#)
  - [Slides](#)
- Generals: Semi-Autonomous Networks: Effective Control of Networked Systems through Design, Modeling, and Protocols
  - [Report](#)
  - [Slides](#)

## Selected Awards

- Springer Thesis Prize: Nominated by the University of Washington an outstanding Ph.D. thesis (2014)
- College of Engineering Dean's Fellowship (2012-2013)
- IROS Student Travel Award (2012)
- Graduate School Fund for Excellence and Innovation (GSFEI) Graduate Student Travel Award (2011,2012)
- Amelia Earhart Fellowship (2010-2011,2011-2012)

- CDC-ECC Student Travel Award (2011)
- Best Session Presentation Award, American Control Conference (2011)
- Kambala Leadership Scholarship (2011)
- ACC Student Travel Award (2011, 2012)
- Clarimont L. Egtvedt Fellowship, University of Washington (2010-2011)
- Outstanding Female Engineer Award, University of Washington (2010)
- Best Student Paper Finalist, 1st IFAC Workshop on Estimation and Control of Networked Systems (2009)
- Andris Vagners Memorial Fellowship, University of Washington (2008-2009)
- Australian Postgraduate Award (2007-2008)
- University of Sydney Merit Scholarship (2002-2006)