ZACHARY CHANCE

PERSONAL INFORMATION

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phone (W) (781) 981 1993 · (M) (317) 490 3852

WORK EXPERIENCE

2012–Present **Technical Staff, MIT Lincoln Laboratory**

MIT Lincoln Laboratory

· Led multiple engineering teams developing algorithms for radar signal processing, multisensor-multitarget tracking, mission planning, and target classification, leading to successful transitions of solutions to government and contractor teams
· Published articles and reports regularly based on advances made in target tracking, sensor networks, and radar theory
· Presented routinely to sponsors and management at all different technical levels, i.e., low-level to executive-level program managers, with exemplary feedback on communication abilities
· Mentored numerous new staff, interns, and military cadets through short-term projects and onboarding periods, while also continuing to guide them in their careers and technical growth
· Employed expertise in radar systems and modern computer science to coordinate data engineering effort for the consolidation and organization of large stores of diverse historical data to aid in the development and test of artificial intelligence algorithms
· Coordinated and led development for open source tools that are now used across the organization as fundamental software for simulation, evaluation, and design of algorithms in the field of adaptive sensing
Reference: Paula Donovan · (781) 981 2126 · pjdonovan@ll.mit.edu
Reference: Sung-Hyun Son · (781) 981 7307 · sson@ll.mit.edu

2011-2012 **Research Assistant, Purdue University**

Purdue University

· Investigated the incorporation of noisy feedback information in physical-layer communications and proved its tangible utility
· Composed multiple technical articles in the area of feedback communications
· Collaborated with several other research assistants on theoretical development, testing, and technical documentation
· Studied the area of radar waveform design for imaging purposes and composed two conference papers on the subject
Reference: David Love · (765) 981 0779 · djlove@purdue.edu

Fall 2011 **Student Intern, MIT Lincoln Laboratory**

MIT Lincoln Laboratory

· Completed two studies on the optimal use of radar resources for the purposes of searching/tracking and the application of compressive sensing techniques to radar imaging
· Wrote technical articles for each corresponding project
· Constructed and presented final reports on the work
Reference: Sung-Hyun Son · (781) 981 7307 · sson@ll.mit.edu

Spring 2011 **Student Intern, Naval Research Laboratory**

Naval Research Laboratory

· Formulated the framework for the optimization of radar waveforms with the goal of imaging
· Built appropriate simulation environment to demonstrate the benefits of waveform optimization
· Composed a technical article and presented final report on the subject
Reference: Raghu G. Raj (202) 767 3662 · raghu.raj@nrl.navy.mil

EDUCATION

2007-2012 Purdue University, West Lafayette

Doctor of Philosophy

GPA: 3.91 · School of Electrical and Computer Engineering
Area of Concentration: *Communications and Signal Processing*
Thesis: *Harnessing the Benefits of Noisy Feedback*
Advisor: Prof. David J. Love

2003-2007 Purdue University, West Lafayette

Bachelor of Science

GPA: 3.92 · School of Electrical and Computer Engineering

PUBLICATIONS

FUSION

July 2024 Adaptive temporal decorrelation of state estimates
Reference: *Proceedings of 2024 27th International Conference on Information Fusion (FUSION)*, July 2024
Authors: Zachary Chance

MSS Tri-Service Radar Symposium

Nov 2021 Differentiable point scattering models for efficient radar target characterization
Reference: *Proceedings of MSS Tri-Service Radar Symposium*, November 2021
Authors: Zachary Chance, Adam Kern, Arianna Burch, Justin Goodwin

Signal Processing, Sensor Fusion, and Target Recognition

Aug 2018 Error statistics of bias-näive filtering in the presence of bias
Reference: *Proceedings of Signal Processing, Sensor Fusion, and Target Recognition*, vol. 10646. SPIE, April 2018
Authors: Zachary Chance, Stephen Relyea, Evan Anderson

NFCS

Feb 2018 Stable extended target Kalman filter
Reference: *Proceedings of National Fire Control Symposium*, February 2018
Authors: Zachary Chance, Stephen Relyea

MITLL Project Report

March 2018 Sensor placement analysis for defense against uncertain raids of ballistic threats
Reference: *MIT Lincoln Laboratory Project Report MD-51*, pp. 1–56, March 2018
Authors: Zachary Chance, Steven R. Vogl, Lori Layne

MITLL Technical Report

Dec 2017 Consistent state estimation for very long-range radars
Reference: *MIT Lincoln Laboratory Technical Report TR-1184*, December 2017
Authors: Jason Cookson, Zachary Chance, Leonardo Urbano

IEEE Transactions on Communications

Aug 2015 Concatenated coding using linear schemes for Gaussian broadcast channels with noisy channel output feedback
Reference: *IEEE Transactions on Communications*, vol. 63, no. 11, pp. 4576–4590, November 2015
Authors: Ziad Ahmad, Zachary Chance, David J. Love, Chih-Chun Wang

MITLL Project Report

Feb 2014 On the blind fusion of Bayesian classification information
Reference: *MIT Lincoln Laboratory Project Report MD-40*, pp. 1–33, December 2013

Authors: Zachary Chance, Lori Layne, Sung-Hyun Son

IEEE Transactions on Communications

Dec 2013 Noncoherent trellis coded quantization: A practical limited feedback technique for massive MIMO systems
Reference: *IEEE Transactions on Communications*, vol. 61, no. 12, pp. 5016–5029, December 2013

Authors: Junil Choi, Zachary Chance, David J. Love, Upamanyu Madhow

ITA

Feb 2013 Noncoherent trellis-coded quantization for massive MIMO limited feedback beamforming
Reference: *Proceedings of Information Theory and Applications Workshop*, pp. 1–6, February 2013

Authors: Junil Choi, Zachary Chance, David J. Love, Upamanyu Madhow

IEEE Transactions on Signal Processing

Aug 2012 Using channel output feedback to increase throughput in hybrid-ARQ
Reference: *IEEE Transactions on Signal Processing*, vol. 60, no. 12, pp. 6465–6480, August 2012

Authors: Mayur Agrawal, Zachary Chance, David J. Love, Venkataramanan Balakrishnan

WDD

Jan 2012 Waveform design for multistatic radar imaging using mutual information
Reference: *Proceedings of International Waveform Diversity and Design Conference*, pp. 1–4, January 2012

Authors: Zachary Chance, Raghu G. Raj, David J. Love

ACSSC

Nov 2011 A sparse Bayesian approach to multistatic radar imaging
Reference: *Proceedings of Asilomar Conference on Signals, Systems, and Computers*, pp. 2107–2110, November 2011

Authors: Raghu G. Raj, Zachary Chance, David J. Love

IEEE Transactions on Information Theory

Oct 2011 Concatenated coding for the AWGN Channel with noisy feedback
Reference: *IEEE Transactions on Information Theory*, vol. 57, no. 10, pp. 6633–6649, October 2011

Authors: Zachary Chance, David J. Love

IEEE Radar Conference

May 2011 Information-theoretic structure of multistatic radar imaging
Reference: *Proceedings of IEEE Radar Conference*, pp. 853–858, May 2011

Authors: Zachary Chance, Raghu G. Raj, David J. Love

IWSPWC *May 2011* A hybrid-ARQ protocol using channel output feedback
Reference: *Proceedings of IEEE International Workshop on Signal Processing Advances in Wireless Communications*, San Francisco, CA, USA, pp. 31–35, June 2011
Authors: Zachary Chance, Mayur Agrawal, David J. Love, Venkataramanan Balakrishnan

ICASSP *Mar 2010* A noisy feedback encoding scheme for the Gaussian channel
Reference: *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 3482–3485, March 2010
Authors: Zachary Chance, David J. Love

ACSSC *Nov 2009* On linear processing in AWGN channels with feedback
Reference: *Proceedings of Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, USA, pp. 986–990, November 2009
Authors: Zachary Chance, David J. Love

Professional Membership and Service

2008–Present · IEEE Senior Member (Elevation to Senior Member in July 2024)

2020–Present · Lead Instructor for Introduction to Radar Course (External)

2017–Present · Instructor for Introduction to Radar Course (Internal and External), State Estimation and Data Association Course (Internal)

2010–Present · Technical Program Committee Member for GlobeCOM, MILCOM, ICCVE, ISIT, ICASSP

2008–Present · Active Reviewer for IEEE Transactions on Aerospace and Electronic Systems, IEEE Transactions on Communications, IEEE Transactions on Signal Processing, IEEE Transactions on Wireless Communications

2008–Present · Active Member of IEEE Signal Processing Society, IEEE Information Theory Society, and IEEE Aerospace and Electronic Systems Society

Other Information

Awards

2023 · Morale and Spirit Award

2021 · Presentation of the Year

2010, 2011, 2012 · Frederic R. Muller Scholarship

2007 · Ross Fellowship

2004 · Schlumberger Scholarship

2004 · Tellkamp-Bostater-Lawrence-Power Scholarship

2003 · Mary Bryan Scholarship

October 17, 2024