

NEIL K. DHINGRA

☎ (248) 760 – 0738

✉ neil.k.dh@gmail.com

🌐 <http://www.neilkdh.com>

EXPERTISE

- Proven program management, business development, and research acumen
- Strong track record of initiating, maintaining, and developing customer relationships
- Ability to effectively communicate complicated technical material via presentations and written manuscripts
- U.S. Citizen; current Top Secret/Sensitive Compartmentalized Information (TS/SCI) security clearance

WORK AND RESEARCH EXPERIENCE

Orbit Logic Incorporated

Boulder, CO

Business and Program Leader

2020 – present

- Develop advanced planning algorithms with an emphasis on space applications and on distributed computing architectures for collaboration and coordination of activity amongst a team of autonomous agents
- Initiate, manage, and develop commercial and teaming relationships with customers and partners
- Identify, pursue, and lead business development opportunities, particularly to transition SBIR/STTR technology to commercial deployment

Numerica Corporation

Fort Collins, CO

Program Manager (2019 – 2020), Research Scientist (2017 – 2019)

2017 – 2020

- Lead a team of 5 research scientists for advanced algorithm design, deployment, and refinement
- Develop algorithms for scheduling ground- and space-based sensor platforms, satellite constellation control, advanced sensor fusion/filtering, hypothesis-based intelligence, image processing for dim object detection, adversarial planning for missile defense scenarios, and interceptor guidance for missile defense
- Research and incorporate state-of-the-art techniques from continuous/discrete/multiobjective optimization, graphical modeling, control theory, game theory, expectation propagation, and other fields into team's work
- Write proposals for and manage execution of government and industry contracts, both as principal investigator (PI) as well as in a supporting role (have won over \$2m worth of SBIR contracts as PI to date)
- Serve as technical lead in commercial negotiations to license Numerica algorithms for external use

University of Minnesota, Control and Dynamical Systems Group

Minneapolis, MN

Research Assistant with Professor Mihailo R. Jovanović

2010 – 2017

- Developed efficient, scalable, and distributable algorithms for solving regularized optimization problems
- Applied algorithms to diverse structured control problems such as distributed control and sensor placement
- Supervised 3 undergraduate and 4 graduate students leading to publications and successful theses
- Helped write successful application to the National Science Foundation resulting in a \$389,673 grant

NASA Armstrong Flight Research Center (*formerly Dryden*)

Edwards, CA

Graduate Fellow

2012 – 2013

- Applied PhD research for optimal sensor selection and placement in NASA's Lockheed Martin X-56 light-weight flexible aircraft model to ensure early onset detection of destructive flutter instabilities

NASA Jet Propulsion Laboratory, Autonomous Systems Division

Pasadena, CA

Space Grant Intern

2010

- Developed *Automated Target Recognition (ATR)* systems to identify and locate targets in images and video using machine learning algorithms (Support Vector Machines, Neural Networks) and *k*-means clustering

EDUCATION

PhD in Electrical Engineering

2010 – 2017

University of Minnesota, Twin Cities, MN

GPA: 3.7/4.0

Thesis: Optimization and control of large-scale networked systems,

Advisor: Professor Mihailo R. Jovanović

BSE in Electrical Engineering, Minor in Mathematics

2006 – 2010

University of Michigan, Ann Arbor, MI, Magna Cum Laude

GPA: 3.5/4.0

OUTREACH ACTIVITIES

Teaching Science, Math and Research Technology Minneapolis, MN
 School Coordinator and Session Leader 2013 - 2016

- Led groups of volunteers to increase STEM interest in elementary/middle school kids via interactive lessons, e.g., circuits/soldering for making a small robot and elementary probability and winning at Monopoly
- Arranged the use of university outreach grants to fund lessons for schools in low-income areas

MnDRIVE Graduate Scholars Program Fellowship Outreach Minneapolis, MN
 Graduate Fellow 2014 - 2016

- Initiated, coordinated, and volunteered with outreach programs: FIRST Lego League Team Mentor, Tech Camp leader, Minnesota Academy of Science State Science Fair Judge
- Organized partnership with Abamath robotics to fund low-income students in a robotics league

TEACHING EXPERIENCE

Electrical and Computer Engineering, University of Minnesota

Guest lecturer,	(EE 8215) <i>Nonlinear Systems,</i>	Spring 2016
Recitation instructor,	(EE 3015) <i>Signals and Systems,</i>	Spring 2016, Fall 2016
Teaching assistant,	(EE 3006) <i>Fundamentals of Electrical Engineering Laboratory,</i>	Fall 2010, Spring 2011

SELECTED HONORS AND AWARDS

DOCTORAL DISSERTATION FELLOWSHIP, University of Minnesota	2015 - 2016
MnDRIVE GRADUATE SCHOLARS FELLOWSHIP, MnDRIVE Initiative	2014 - 2016
HARRIET G. JENKINS PREDOCTORAL FELLOWSHIP, NASA	2011 - 2014
ECE DEPARTMENTAL FELLOWSHIP, University of Minnesota	2010 - 2011
BEST PRESENTATION IN SESSION, American Control Conference	2016
STUDENT TRAVEL GRANTS, American Control Conference and Doctoral Dissertation Fellowship	2016
SPACE GRANT AWARD RECIPIENT, Michigan Space Grant Consortium	2010

PUBLICATIONS

JOURNAL PAPERS

1. N. K. Dhingra, M. Colombino, and M. R. Jovanović. *Structured decentralized control of positive systems with applications to combination drug therapy and leader selection in directed networks*. IEEE Trans. Control Netw. Syst., 6(1):352-362, 2019.
2. A. Zare, H. Mohammadi, N. K. Dhingra, and M. R. Jovanović. *Proximal algorithms for large-scale statistical modeling and sensor/actuator selection*. IEEE Trans. Automat. Control, 2019. note: *Doi:10.1109/TAC.2019.2948268; also arXiv:1807.01739*.
3. N. K. Dhingra, S. Z. Khong, and M. R. Jovanović. *The proximal augmented Lagrangian and for nonsmooth composite optimization*. IEEE Trans. Automat. Control, 64(7):2861-2868, 2019.
4. N. K. Dhingra, S. Z. Khong, and M. R. Jovanović. *A second-order primal-dual algorithm for nonsmooth composite minimization*. IEEE Trans. Automat. Control, 2017, note: *conditionally accepted; also arXiv:1709.01610*.
5. M. R. Jovanović and N. K. Dhingra. *Controller architectures: tradeoffs between performance and structure*. Eur. J. Control, 30:76-91, 2016.

SELECTED CONFERENCE PAPERS

6. N.K. Dhingra, K. Center, E. Herz, E. Sneath, and S. Gagnard. *APS: Multi-Domain Decentralized Planning for Responsive Multi-Asset Collaborative Autonomy*. In Proc. 16th International Conference on Space Operations, Cape Town, South Africa, 2021. Note: SpaceOps-2021,6,x,1634.

7. J. Aristoff, N. K. Dhingra, A. Ferris, A. Hariri, J. Horwood, A. Larson, T. Lyons, J. Shaddix, N. Singh, and K. Wilson. *Non-Traditional Data Collection and Exploitation for Improved GEO SSA via a Global Network of Heterogeneous Sensors*. In Proc. 2018 Advanced Maui Optical and Space Surveillance Technologies Conference, Wailea, HI, 2018.
8. D. Ding, B. Hu, N. K. Dhingra, M. R. Jovanović. *A second order primal-dual algorithm for non-smooth convex composite optimization*. In Proc. 56th IEEE Conference on Decision and Control, Melbourne, Australia, pp. 2868-2873, 2017.
9. N. K. Dhingra, S. Z. Khong, and M. R. Jovanović. *A second order primal-dual algorithm for non-smooth convex composite optimization*. In Proc. 56th IEEE Conference on Decision and Control, Melbourne, Australia, pp. 2868-2873, 2017.
10. A. Zare, N. K. Dhingra, M. R. Jovanović, and T. T. Georgiou. *Structured covariance completion via proximal algorithms*. In Proc. 56th IEEE Conference on Decision and Control, Melbourne, Australia, pp. 3775-3780, 2017.
11. N. K. Dhingra, M. Colombino, and M. R. Jovanović. *Leader selection in directed networks*. In Proc. 55th IEEE Conference on Decision and Control, Las Vegas, NV, pp. 2715-2720, 2016.
12. M. Colombino, N. K. Dhingra, M. R. Jovanović, and Roy S. Smith. *Convex Reformulation of a Robust Optimal Control Problem for a Class of Positive Systems*. In Proc. 55th IEEE Conference on Decision and Control, Las Vegas, NV, pp. 5263-5268, 2016.
13. S. Hassan-Moghaddam, N. K. Dhingra, and M. R. Jovanović. *Topology identification of undirected consensus networks via sparse inverse covariance estimation*. In Proc. 55th IEEE Conference on Decision and Control, Las Vegas, NV, pp. 4624-4629, 2016.
14. N. K. Dhingra, Xiaofan Wu, and M. R. Jovanović, *Sparsity-promoting optimal control of systems with invariances and symmetries*, in Proc. 10th IFAC Symposium on Nonlinear Control Systems, Monterey, CA, pp. 648-653, 2016.
15. M. Colombino, N.K. Dhingra, M.R. Jovanović, A. Rantzer, and R.S. Smith. *On the optimal control problem for a class of monotone bilinear systems*. In Proc. 22nd International Symposium on Mathematical Theory of Networks and Systems, Minneapolis, MN, pp. 411-413, 2016.
16. N. K. Dhingra, M. Colombino and M. R. Jovanović, *On the convexity of a class of structured optimal control problems for positive systems*. In Proc. 2016 European Control Conference, Aalborg, Denmark, pp. 825-830, 2016.
17. N. K. Dhingra, and M. R. Jovanović, *A method of multipliers algorithm for sparsity-promoting optimal control*. In Proc. 2016 American Control Conference, Boston, MA, pp. 1942-1947, 2016.
18. N. K. Dhingra, and M. R. Jovanović, *Convex synthesis of symmetric modifications to linear systems*. In Proc. 2015 American Control Conference, Chicago, IL, pp. 3583-3588, 2015.
19. N. K. Dhingra, M. R. Jovanović, and Z. Q. Luo, *Optimal sensor and actuator selection for large-scale dynamical systems*,. In Proc. 49th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, 2015.
20. N. K. Dhingra, M. R. Jovanović, and Z. Q. Luo, *An ADMM algorithm for optimal sensor and actuator selection*. In Proc. 53rd IEEE Conference on Decision and Control, Los Angeles, CA, pp. 4039-4044, 2014.
21. David Zoltowski, N. K. Dhingra, F. Lin, and M. R. Jovanović, *Sparsity-promoting optimal control of spatially-invariant systems*. In Proc. 2014 American Control Conference, Portland, OR, pp. 1261-1266, 2014.
22. N. K. Dhingra, F. Lin, M. Fardad and M. R. Jovanović, *On identifying sparse representations of consensus networks*. In Proc. 3rd IFAC Workshop on Distributed Estimation and Control in Networked Systems, Santa Barbara, CA, pp. 305-310, 2012.
23. M. Scholten, N. K. Dhingra, T.T. Lu and T.H. Chao, *Optimization of support vector machine (SVM) for object classification*. In SPIE Defense, Security, and Sensing, pp. 839806-1–839806-9, International Society for Optics and Photonics, 2012.