

Curriculum Vitæ for Dr. Neil T. Dantam

web: <http://www.neil.dantam.name>

I. Personal Data

Name Neil Thomas Dantam

Affiliation Assistant Professor
Department of Computer Science
Colorado School of Mines
Golden, CO 80401, USA

Citizenship USA
(Born: Anderson, Indiana)

II. Education

- Ph.D. in Robotics, December 2014

University Georgia Institute of Technology

Advisor Prof. Mike Stilman

Committee Chair Prof. Henrik Christensen

Thesis Title *A Linguistic Method for Robot Verification, Programming, and Control*

- B.S. in Computer Science, Purdue University, May 2008
- B.S.M.E. in Mechanical Engineering, Minor in Economics, Purdue University, May 2008
- Indiana Academy for Science, Mathematics, and Humanities, May 2004

III. Publications

Refereed Journal Papers

- [1] N. T. Dantam, Z. Kingston, S. Chaudhuri, and L. E. Kavraki, “An incremental constraint-based framework for task and motion planning,” *International Journal of Robotics Research, Special Issue on the 2016 Robotics: Science and Systems Conference*, 2018.
- [2] N. T. Dantam, S. Chaudhuri, and L. E. Kavraki, “The task motion kit (accepted),” *Robotics and Automation Magazine*, 2018.

- [3] N. T. Dantam, K. Bøndergaard, M. A. Johansson, T. Furuholm, and L. E. Kavraki, “Unix philosophy and the real world: Control software for humanoid robots,” *Frontiers in Robotics and Artificial Intelligence, Research Topic on Software Architectures for Humanoid Robotics*, vol. 3, 2016.
- [4] N. T. Dantam, D. M. Lofaro, A. Hereid, P. Oh, A. Ames, and M. Stilman, “The ach ipc library,” *Robotics and Automation Magazine*, vol. 22, no. 1, pp. 76–85, 2015.
- [5] N. T. Dantam and M. Stilman, “The motion grammar: Analysis of a linguistic method for robot control,” *Transactions on Robotics*, vol. 29, no. 3, pp. 704–718, 2013.

Refereed Conference Papers

- [6] N. T. Dantam, Z. Kingston, S. Chaudhuri, and L. E. Kavraki, “Incremental task and motion planning: A constraint-based approach,” in *Robotics: Science and Systems*, 2016.
- [7] Y. Wang, N. T. Dantam, S. Chaudhuri, and L. E. Kavraki, “Task and motion policy synthesis as liveness games,” in *International Conference on Automated Planning and Scheduling. AAAI*, 2016.
- [8] Z. Kingston, N. T. Dantam, and L. E. Kavraki, “Kinematically constrained workspace control via linear optimization,” in *International Conference on Humanoid Robots. IEEE*, 2015, pp. 758–764.
- [9] N. T. Dantam, H. B. Amor, H. Christensen, and M. Stilman, “Online multi-camera registration for bimanual workspace trajectories,” in *International Conference on Humanoid Robots. IEEE*, 2014, pp. 588–593, **Best Paper Finalist, Mike Stilman Award Finalist**.
- [10] N. T. Dantam and M. Stilman, “Spherical parabolic blends for robot workspace trajectories,” in *International Conference on Intelligent Robots and Systems. IEEE*, 2014, pp. 3624–3629.
- [11] N. T. Dantam, H. B. Amor, H. Christensen, and M. Stilman, “Online camera registration for robot manipulation,” in *International Symposium on Experimental Robotics. Springer*, 2014, pp. 179–194.
- [12] N. T. Dantam, A. Hereid, A. Ames, and M. Stilman, “Correct software synthesis for stable speed-controlled robotic walking,” in *Robotics: Science and Systems*, 2013.
- [13] M. Grey, N. T. Dantam, D. M. Lofaro, P. Oh, A. Bobick, M. Egerstedt, and M. Stilman, “Multi-process control software for humanoid robots,” in *IEEE International Conference on Technologies for Practical Robot Applications*, 2013, pp. 190–195.
- [14] N. T. Dantam and M. Stilman, “Robust and efficient communication for real-time multi-process robot software,” in *International Conference on Humanoid Robots. IEEE*, 2012, pp. 316–322.
- [15] N. T. Dantam, I. Essa, and M. Stilman, “Linguistic transfer of human assembly tasks to robots,” in *Intelligent Robots and Systems. IEEE*, 2012.

- [16] N. T. Dantam, C. Nieto-Granda, H. Christensen, and M. Stilman, “Linguistic composition of semantic maps and hybrid controllers,” in *International Symposium on Experimental Robotics*, 2013, pp. 699–714.
- [17] N. T. Dantam and M. Stilman, “The motion grammar calculus for context-free hybrid systems,” in *American Control Conference*, 2012, pp. 5294–5301, **Best Presentation in Session**.
- [18] —, “The motion grammar: Linguistic perception, planning, and control,” in *Robotics: Science and Systems*, 2011.
- [19] N. T. Dantam, P. Kolhe, and M. Stilman, “The motion grammar for physical human-robot games,” in *International Conference on Robotics and Automation*. IEEE, 2011, **SAIC/Georgia Tech Achievement Award**.
- [20] P. Kolhe, N. T. Dantam, and M. Stilman, “Dynamic pushing strategies for dynamically stable mobile manipulators,” in *International Conference on Robotics and Automation*. IEEE, 2010.

Workshop Papers

- [21] N. T. Dantam, H. B. Amor, H. Christensen, and M. Stilman, “Fault recovery in logical manipulation policies,” in *Workshop on Human versus Robot Grasping and Manipulation, RSS*, 2014.
- [22] A. Rouhani, N. T. Dantam, and M. Stilman, “Software-synthesis via ll^* for context-free robot programs,” in *4th Workshop on Formal Methods for Robotics and Automation, RSS*, 2013.
- [23] N. T. Dantam, M. Egerstedt, and M. Stilman, “Make your robot talk correctly: Deriving models of hybrid system,” in *RSS Workshop on Grounding Human-Robot Dialog for Spatial Tasks*, 2011.

Technical Reports

- [24] N. T. Dantam, S. Chaudhuri, and L. E. Kavraki, “The task motion kit,” Department of Computer Science, Rice University, Tech. Rep. TR06-12, 2016.
- [25] N. T. Dantam, I. Essa, and M. Stilman, “Algorithms for linguistic robot policy inference from demonstration of assembly tasks,” Georgia Institute of Technology, Tech. Rep. GT-GOLEM-2012-002, 2012.
- [26] N. T. Dantam and M. Stilman, “Ach: Ipc for real-time robot control,” Georgia Institute of Technology, Tech. Rep. GT-GOLEM-2011-003, 2011.
- [27] N. T. Dantam, P. Kolhe, and M. Stilman, “Equations of motion for dynamically stable mobile manipulators,” College of Computing. Georgia Institute of Technology, Tech. Rep. GT-GOLEM-2010-002, 2010.
- [28] N. T. Dantam and M. Stilman, “The motion grammar: Linguistic perception, planning, and control,” College of Computing. Georgia Institute of Technology, Tech. Rep. GT-GOLEM-2010-001, 2010.

IV. Professional Experience

Colorado School of Mines (2017-present) *Assistant Professor* – Golden; CO

Rice University (2014-2017) *Postdoctoral Research Associate* – Houston; TX

- Advised undergraduate students conducting research, leading to publication at Humanoids 2015.
- Directed software development for planning and control on the Baxter and UR5 robots

Georgia Tech Humanoids Lab (2008-2014) *Research Assistant and Lab Manager* – Atlanta; GA

- Developed Real-Time IPC and control software for lab robots
- Maintained Lab organization, infrastructure, and computing
- Established LDAP/Kerberos/NFS services for Lab computing

iRobot (Summer 2010) *Robotics Research Intern* – Bedford; MA

- Improved control performance of 510 PackBot EOD arm by implementing Singularity-Robust Jacobian Inverse Kinematics (IK)
- Assisted transition of IK to production—including on all shipping PackBots
- Developed dynamic model of PackBot arm for workspace force estimation and weight sensing
- Developed prototype user display of PackBot arm jointspace and workspace forces
- Interfaced iRobot Aware2 and Willow Garage ROS software suites

MIT Lincoln Laboratory (Summer 2009) *Robotics Intern* – Lexington; MA

- Interfaced iRobot ATRV-Mini robot with Willow Garage ROS software suite
- Developed local, reactive motion planner for ATRV and PackBot mobile robots using Potential Fields
- Assisted system integration and demonstration

MIT Lincoln Laboratory (Summer 2008) *Software Engineering Intern* – Lexington; MA

- Worked with end users to evaluate software design requirements
- Developed web-based configuration tool for a Network Emulation Testbed using PHP/AJAX

C-SPAN Archives (Spring 2008) *Web Developer* – West Lafayette; IN

- Improved Flash web video player, adding features and increasing stability

Purdue University (Summer 2007) *Research Assistant* – West Lafayette; IN

- Designed CAN and Ethernet based remote drive-by-wire system for hydrostatic transmission vehicle
- Completed design of algorithm for conservative, on-the-fly, mostly-copying garbage collection

Raytheon (Summer 2006) *Software Engineering Intern* – Indianapolis; IN

- Evaluated Navy software on Windows NT, Linux, and HP-UX
- Revised trade study document on Navy software

ContactSul (Summer 2005) *IT Intern* – Camboriú; SC; Brazil

- Configured and deployed Debian GNU/Linux DNS, web, email, and file server
- Prototyped web-based order system

Delaware Machinery (2003-2004) *Software Developer* – Muncie; IN

- Developed LabView Code Interface Node for network access
 - Designed prototype web-based embedded tape reader emulator for CNC
 - Other embedded and web-based Java programming
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V. Teaching Experience

- 2017** • Instructor. Theory of Computation. Colorado School of Mines.
- 2015** • Guest Lecturer. Algorithmic Robotics. Rice University.
- 2013** • Guest Lecturer. Robot Intelligence: Planning in Action. Georgia Tech.
- 2012** • Guest Lecturer. Robot Intelligence: Planning in Action. Georgia Tech.
• TA. Introduction to Perception and Robotics. Georgia Tech.
- 2011** • Volunteer. 2nd Grade Math Club. Hope-Hill Elementary School. Atlanta, GA.
- 2010** • TA. Introduction to Perception and Robotics. Georgia Tech.
- 2009** • TA. Building Humanoid Robots. Georgia Tech.
- 2006** • Lab Instructor. Introductory C Programming. Purdue University.
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VI. Service and Community

Keynote / Plenary Presentations

- *Language, Logic, and Motion: Synthesizing Robot Software (invited)*. International Conference on Humanoid Robots, Towards Humanoid Robots OS Workshop. November 2016.
- *Incremental Task and Motion Planning*. Robotics: Science and Systems, Workshop on Task and Motion Planning. June 2016.

Committees and Groups

- 2018** • Program Committee. AAAI.
- 2017** • Editorial Board (Review Editor). Frontiers in Robotics and AI.
• Associate Editor. Robotics and Automation Letters (RA-L).
• Organizer of Workshop on Task and Motion Planning. Robotics: Science and Systems (RSS).
• Program Committee. International Joint Conference on Artificial Intelligence (IJCAI).
• Co-Organizer of Workshop on Semantic Policy and Action Representations. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).
- 2016** • Editorial Board (Review Editor). Frontiers in Robotics and AI.
• Associate Editor. Robotics and Automation Letters (RA-L).
• Program Committee. International Joint Conference on Artificial Intelligence (IJCAI).
• Organizer of Workshop on Task and Motion Planning. Robotics: Science and Systems (RSS).
- 2015** • Editorial Board (Review Editor). Frontiers in Robotics and AI.
• Associate Editor. Robotics and Automation Letters (RA-L).
• Co-Organizer of Workshop on Semantic Policy and Action Representations. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).
- 2014** • Editorial Board (Review Editor). Frontiers in Robotics and AI.
• Organizer of Workshop on Policy Representation. International Conference on Humanoid Robots (HUMANOIDS).
- 2012** • Coordinator of ROS Special Interest Group on Inter-Process Communication.
• Program Committee. ROSCon.
- 2011** • Georgia Tech. Ph.D. Recruiting Committee.

Open Source

TMKit	Extensible Framework for Task–Motion Planning https://github.com/kavrakilab/tmkit
Amino	Robot utilities and modeling for planning and real-time control https://github.com/golems/amino
Ach	Real-Time messaging IPC for POSIX (userspace) and Linux (kernel-space) https://github.com/golems/ach
Motion Grammar Kit	Formal Language Tools for Robots https://github.com/golems/motion-grammar-kit
S-Protobuf	Google Protocol Buffers in Common Lisp https://github.com/ndantam/s-protobuf

Journal and Conference Reviews

- 2018** • International Conference on Robotics and Automation (ICRA)
- 2017** • International Conference on Robotics and Automation (ICRA)
 - Autonomous Robots (AURO)
 - International Conference on Humanoid Robots (Humanoids)
 - Intelligent Robots and Systems (IROS)
 - Journal of Experimental & Theoretical Artificial Intelligence
 - Robotics and Automation Letters (RA-L)
 - Transactions on Robotics (TRO)
 - International Symposium on Robotics Research (ISRR)
- 2016** • Robotics and Automation Letters (RA-L)
 - Conference on Automation Science and Engineering (CASE)
 - Transactions on Robotics (TRO)
 - International Conference on Humanoid Robots (Humanoids)
 - Symposium on Robot and Human Interactive Communication (ROMAN)
 - Intelligent Robots and Systems (IROS)
 - Conference on Decision and Control (CDC)
 - Frontiers in Robotics and AI (FRAI)
 - Robotics: Science and Systems (RSS)
 - Robotics and Automation Magazine (RAM)
 - International Journal of Robotics Research (IJRR)
 - International Conference on Robotics and Automation (ICRA)
- 2015** • Transactions on Robotics (TRO)
 - Robotics and Automation Letters (RA-L)
 - Intelligent Robots and Systems (IROS)
 - International Journal of Robotics Research (IJRR)
 - International Conference on Robotics and Automation (ICRA)
- 2014** • Frontiers in Robotics and AI
 - International Conference on Humanoid Robots (Humanoids)
 - Multi-conference on Systems and Control (MSC)
 - Intelligent Robots and Systems (IROS)
 - International Conference on Robotics and Automation (ICRA)
- 2013** • Transactions on Interactive Intelligent Systems (TiiS)
 - Intelligent Robots and Systems (IROS)

- International Conference on Robotics and Automation (ICRA)
- International Conference on Humanoid Robots (Humanoids)
- 2012** • Intelligent Robots and Systems (IROS)
- Discrete Event Dynamic Systems (DEDS)
- Transactions on Robotics (TRO)
- International Conference on Robotics and Automation (ICRA)
- 2011** • 2011 Conference on Automation Science and Engineering (CASE)
- 2011 International Conference on Robotics and Automation (ICRA)

VII. Awards

- Best Paper Finalist – International Conference on Humanoid Robots, 2014
- Mike Stilman Award Finalist – International Conference on Humanoid Robots, 2014
- Best Presentation in Session – American Control Conference, 2012
- Achievement Award – SAIC - Georgia Tech Student Paper Competition, 2011
- President’s Fellowship – Georgia Institute of Technology, 2008
- Poster Award – Purdue Undergraduate Research Symposium, 2007
- Academic Success Award – Purdue University, 2004-2008
- Indiana Resident Top Scholar – Purdue University, 2004-2008
- Dean’s Engineering Scholar – Purdue University, 2004
- Chemistry Contest Scholarship – American Chemical Society, 2003
- Caltech Signature Award – Indiana Academy for Science, Mathematics, and Humanities, 2003