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# Mark Moll

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## EMPLOYMENT

<b>Rice University</b> , <i>Houston, TX</i> Senior Research Scientist, Department of Computer Science	2016–present
<b>Rice University</b> , <i>Houston, TX</i> Adjunct Faculty Member, Department of Computer Science	2011–present
<b>Rice University</b> , <i>Houston, TX</i> Research Scientist, Department of Computer Science	2007–2016
<b>Information Sciences Institute</b> , <i>USC, Marina del Rey, CA</i> Computer Scientist, Polymorphic Robotics Lab	2005–2007
<b>Rice University</b> , <i>Houston, TX</i> Research Associate, Physical and Biological Computing Group, and Postdoctoral Fellow, W.M. Keck Center for Computational Biology	2002–2005
<b>Carnegie Mellon University</b> , <i>Pittsburgh, PA</i> Research Assistant, Manipulation Lab	1996–2002
<b>University of California at Berkeley</b> , <i>Berkeley, CA</i> Visiting Researcher, Berkeley Automation Sciences Lab	2001–2001
<b>Leiden University</b> , <i>Leiden, The Netherlands</i> Researcher, Centre for Science and Technology Studies	1995–1996
<b>University of Twente</b> , <i>Enschede, The Netherlands</i> Research Assistant, Parlevink Language Engineering Group	1995–1995
<b>University of Texas</b> , <i>Austin, TX</i> Visiting Researcher, Neural Nets Research Group	1993–1993

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## EDUCATION

<b>Carnegie Mellon University</b> , <i>Pittsburgh, PA</i> Ph.D. in Computer Science Thesis title: <a href="#">Shape Reconstruction Using Active Tactile Sensors</a> Thesis advisor: Professor Michael A. Erdmann	1996–2002
<b>University of Twente</b> , <i>Enschede, The Netherlands</i> M.S. in Computer Science Thesis title: <a href="#">Head-Corner Parsing Using Typed Feature Structures</a> Thesis advisor: Dr. Rieks op den Akker	1990–1995

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## TEACHING

### **Rice University, Houston, TX**

- Taught guest lectures for Algorithmic Robotics (COMP 450), Geometric Methods in Structural Computational Biology (COMP 470), and Biomedical Informatics (COMP 573), several semesters.
- Taught COMP 450, Algorithmic Robotics, Fall 2011.
- Developed a teaching module for motion planning, including a series of assignments and accompanying software (see p. 10).
- Developed and taught an advanced graduate class on control theory for motion planning (see <http://www.cs.rice.edu/~mmoll/control>), Spring 2004.
- Coordinated an introductory computational biology seminar, Summer 2003.
- Organized an introductory robotics seminar, Spring 2003.
- Organized a reading group on probabilistic motion planning techniques, Fall 2002.

### **Carnegie Mellon University, Pittsburgh, PA**

- Taught guest lectures for Robotic Manipulation, Fall 2001.
- Served as teaching assistant for Robotic Manipulation (Fall 2000) and Computer Graphics (Fall 1998).
- Participated in several workshops organized by the Eberly Center for Teaching Excellence: Overview of Student Motivation, Planning Effective Lectures, Working Well with Small Groups, video observation of a lecture, 1998–2000.

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## ACADEMIC ADVISING

### THESIS COMMITTEE MEMBER

Dave Coleman, PhD, *Methods for Improving Motion Planning Using Experience*, University of Colorado Boulder, December 2016.

Stephen Butler, MS, *General Algorithms for the Time-Optimal Trajectory Generation Problem*, Rice University, November 2016.

Ryan Luna, PhD, *Combining Discrete and Continuous Reasoning for Robot Motion Planning in Complex Domains*, Rice University, May 2016.

Devin Grady, PhD, *Motion Planning with Uncertain Information in Robotic Tasks*, Rice University, December 2013.

Jeffrey Chyan, MS, *Examining the Use of Homology Models in Predicting Kinase Binding Affinity*, Rice University, August 2013.

Ioan Şucan, PhD, *Motion Planning using Task Graphs for Mobile Manipulators*, Rice University, August 2011.

Devin Grady, MS, *Unsynchronized Distributed Motion Planning with Safety Guarantees under Second-Order Dynamics*, Rice University, April 2011.

## RESEARCH SUPERVISION

*Post-docs:* Didier Devaurs, Dinler Antunes, Ankur Dhanik, Bryant Gipson, Nurit Haspel.

*Graduate students:* Zachary Kingston, Jayvee Abella, Stephen Butler, Martha Witick, Sarah Kim, Anastasia Novinskaya, Ryan Luna, Jeffrey Chyan, Devin Grady, Ioan Şucan, Drew Bryant, Harris Chiu, David Schwarz, Mili Shah.

*Undergraduate students:* Colin Losey, Sujay Tadwalkar, Prudhvi Boyapalli, Konstantinos Varvarezos, Beck Chen, Caleb Voss, Riya Fukui, Elizabeth Fudge, Christopher Alme, Neal Ehardt, Ricardo Alvarez, Nick Zhu, Nick Bridle, Nicolas Feltman, Allison Heath.

*Google Summer of Code students:* Luis Torres (UNC Chapel Hill, 2013), Caleb Voss (Rice, 2013), Dave Coleman (U. Colorado, 2014), Javier Gomez (Universidad Carlos III de Madrid, 2014).

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## PROFESSIONAL SERVICE

- Moderator for the [arXiv Robotics section](#), 2016–present.
- Review Manager for the 2014 Robotics Science and Systems (RSS) conference.
- Senior Member of the [IEEE](#), 2013–present.
- Associate Editor for the [Conference Editorial Board](#) of the [IEEE International Conference on Robotics and Automation \(ICRA\)](#) 2015, 2008–2013.
- Associate Editor for the [Conference Paper Review Board](#) of the [IEEE/RSJ International Conference on Intelligent Robots and Systems \(IROS\)](#) 2011–2013, 2008.
- Co-organizer of the [Motion Planning for Mobile Manipulation Tutorial](#) at ICRA 2013.
- Co-organizer of the [Robot Motion Planning for Real Robots Tutorial](#) at IROS 2011.
- Co-organizer of the [Protein Structure, Kinematics, and Motion Planning Workshop](#) at the 2009 “Robotics: Science & Systems” conference.
- Main organizer of a [motion planning tutorial](#) at IROS 2008.
- Main organizer of the [Workshop on Self-Reconfigurable Modular Robots](#) at the 2006 “Robotics: Science & Systems” Conference.
- Member of the [IEEE Robotics & Automation Society Technical Committees](#) on (1) [Algorithms for Planning and Control of Robot Motion](#), (2) [Software Engineering for Robotics and Automation](#), and (3) [Networked Robotics](#).
- Member of NSF review panels, 2015–2017.
- Program committee member for the following conferences:
  - [Workshop on the Algorithmic Foundations of Robotics](#) (2016, 2010, 2008, 2004)
  - [Intl. Joint Conf. on Artificial Intelligence \(IJCAI\)](#) 2016
  - [IEEE Intl. Conf. on Bioinformatics and Biomedicine \(BIBM\)](#) 2015
  - [AAAI conference](#) (2013, 2007, 2006),
  - “[Robotics: Science and Systems](#)” Conference (2017, 2015, 2013, 2012, 2005–2010)
  - [IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems](#) (2006, 2005, 2001)
  - [Workshop on Robotics Methods for Struct. and Dynamic Modeling of Molec. Systems \(RMMS\)](#) 2014)
  - [Computational Structural Biology Workshop \(CSBW\)](#) 2013–2014).

- Referee for the following journals:
  - Algorithmica
  - BMC Bioinformatics
  - Expert Opinion on Drug Discovery
  - IEEE/ACM Trans. on Comp. Biology and Bioinf.
  - IEEE Trans. on Robotics
  - IEEE Trans. on Automation Science and Eng.
  - IEEE Trans. on Systems, Man, and Cybernetics, A
  - IEEE Robotics and Automation Letters
  - IEEE Robotics and Automation Magazine
  - Intl. Journal of Computer Vision
  - Intl. Journal of Robotics Research
  - Intl. Journal of Mechatronics
  - Journal of Computational Biology
  - Journal of Molecular Graphics and Modelling
  - PLOS ONE
  - PLOS Computational Biology
  - Proteins: Structure, Function, and Bioinformatics
  - Robotica
  - Robotics and Autonomous Systems
  - Theoretical Computer Science
  - Visual Computer
  
- Referee for the following conferences:
  - IEEE Intl. Conf. on Robotics and Automation (ICRA 2017, 2016, 2010–2014, 2007, 2002–2005)
  - IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS 2016, 2012, 2009, 2005–2007, 2001)
  - Humanoids 2015
  - Extreme Science and Engineering Discovery Environment Conf. (XSEDE 2013)
  - 13th Intl. Conf. on Ubiquitous Computing (UbiComp 2011)
  - Workshop on Algorithms in Bioinformatics (WABI 2010)
  - American Control Conference (ACC 2010)
  - Intl. Conf. On Computational Systems Bioinformatics (CSB 2008, 2007)
  - SIGGRAPH (2007, 2006)
  - Symposium on Computational Geometry (SoCG 2004)
  - Intl. Conf. on Research in Computational Molecular Biology (RECOMB 2012, 2003)
  - The Workshop on the Algorithmic Foundations of Robotics (2012)

## PUBLICATIONS

Publications are available online at <http://mmoll.rice.edu/publications.html>.

### REFEREED JOURNAL ARTICLES

- J23 D. Devaurs, D. A. Antunes, M. Papanastasiou, **M. Moll**, D. Ricklin, J. D. Lambris, and L. E. Kavraki. Coarse-grained conformational sampling of protein structure improves the fit to experimental hydrogen-exchange data. *Frontiers in Molecular Biosciences*, 4(13), March 2017. DOI: [10.3389/fmolb.2017.00013](https://doi.org/10.3389/fmolb.2017.00013).
- J22 A. Novinskaya, D. Devaurs, **M. Moll**, and L. E. Kavraki. Defining low-dimensional projections to guide protein conformational sampling. *Journal of Computational Biology*, 24(1):79–89, January 2017. DOI: [10.1089/cmb.2016.0144](https://doi.org/10.1089/cmb.2016.0144). (A preliminary version of this article was first published as a conference paper; see below.)
- J21 **M. Moll**, P. W. Finn, and L. E. Kavraki. Structure-guided selection of specificity determining positions in the human kinome. *BMC Genomics*, August 2016. DOI: [10.1186/s12864-016-2790-3](https://doi.org/10.1186/s12864-016-2790-3). (A preliminary version of this article was first published as a conference paper; see below.)
- J20 L. E. Kavraki and **M. Moll**. Special issue on the 2014 “Robotics: Science & Systems” conference (guest editorial). *Intl. J. of Robotics Research*, 35(1–3):3–4, March 2016. DOI: [10.1177/0278364915608299](https://doi.org/10.1177/0278364915608299).

- J19 **M. Moll**, I. A. Şucan, and L. E. Kavraki. Benchmarking motion planning algorithms: An extensible infrastructure for analysis and visualization. *IEEE Robotics & Automation Magazine (Special Issue on Replicable and Measurable Robotics Research)*, 22(3):96–102, September 2015. DOI: [10.1109/MRA.2015.2448276](https://doi.org/10.1109/MRA.2015.2448276).
- J18 D. K. Grady, **M. Moll**, and L. E. Kavraki. Extending the applicability of POMDP solutions to robotic tasks. *IEEE Trans. on Robotics*, 31(4):948–961, August 2015. DOI: [10.1109/TRO.2015.2441511](https://doi.org/10.1109/TRO.2015.2441511).
- J17 **M. Moll**, J. Bordeaux, and L. E. Kavraki. Software for project-based learning of robot motion planning. *Computer Science Education, Special Issue on Robotics in CS Education*, 23(4):332–348, 2013. DOI: [10.1080/08993408.2013.847167](https://doi.org/10.1080/08993408.2013.847167).
- J16 B. Gipson, **M. Moll**, and L. E. Kavraki. SIMS: A hybrid method for rapid conformational analysis. *PLOS ONE*, 8(7):e68826, July 2013. DOI: [10.1371/journal.pone.0068826](https://doi.org/10.1371/journal.pone.0068826).
- J15 D. H. Bryant, **M. Moll**, P. W. Finn, and L. E. Kavraki. Combinatorial clustering of residue position subsets predicts inhibitor affinity across the human kinome. *PLOS Computational Biology*, 9(6):e1003087, June 2013. DOI: [10.1371/journal.pcbi.1003087](https://doi.org/10.1371/journal.pcbi.1003087).
- J14 I. A. Şucan, **M. Moll**, and L. E. Kavraki. The Open Motion Planning Library. *IEEE Robotics & Automation Magazine*, 19(4):72–82, December 2012. DOI: [10.1109/MRA.2012.2205651](https://doi.org/10.1109/MRA.2012.2205651). <http://ompl.kavrakilab.org>.
- J13 K. E. Bekris, D. K. Grady, **M. Moll**, and L. E. Kavraki. Safe distributed motion coordination for second-order systems with different planning cycles. *Intl. J. of Robotics Research*, 31(2):129–149, February 2012. DOI: [10.1177/0278364911430420](https://doi.org/10.1177/0278364911430420).
- J12 **M. Moll**, D. H. Bryant, and L. E. Kavraki. The LabelHash server and tools for substructure-based functional annotation. *Bioinformatics*, 27(15):2161–2162, June 2011. DOI: [10.1093/bioinformatics/btr343](https://doi.org/10.1093/bioinformatics/btr343).
- J11 **M. Moll**, D. H. Bryant, and L. E. Kavraki. The LabelHash algorithm for substructure matching. *BMC Bioinformatics*, 11(555), November 2010. DOI: [10.1186/1471-2105-11-555](https://doi.org/10.1186/1471-2105-11-555). Marked as “highly accessed” on BioMed Central.
- J10 **M. Moll**, J. Bordeaux, and L. E. Kavraki. Teaching robot motion planning. *ASEE Computers in Education Journal (Special Issue on Novel Approaches to Robotics Education)*, 20(3):50–59, 2010. URL: <https://www.asee.org/papers-and-publications/publications/division-publications/computers-in-education-journal/volume-xx>.
- J9 D. H. Bryant, **M. Moll**, B. Y. Chen, V. Y. Fofanov, and L. E. Kavraki. Analysis of substructural variation in families of enzymatic proteins with applications to protein function prediction. *BMC Bioinformatics*, 11(242), May 2010. DOI: [10.1186/1471-2105-11-242](https://doi.org/10.1186/1471-2105-11-242). **Evaluated on the Faculty of 1000 web site.**
- J8 N. Haspel, **M. Moll**, M. L. Baker, W. Chiu, and L. E. Kavraki. Tracing conformational changes in proteins. *BMC Structural Biology*, 10(Suppl. 1):S1, 2010. DOI: [10.1186/1472-6807-10-S1-S1](https://doi.org/10.1186/1472-6807-10-S1-S1). (A preliminary version of this article was first published as a conference paper; see below.)
- J7 **M. Moll** and D. Rus. Special issue on self-reconfiguring modular robots (guest editorial). *Intl. J. of Robotics Research*, 27(3/4):277–278, March/April 2008. DOI: [10.1177/0278364908089348](https://doi.org/10.1177/0278364908089348).
- J6 M. Yim, W.-M. Shen, B. Salemi, D. Rus, **M. Moll**, H. Lipson, and E. Klavins. Modular self-reconfigurable robot systems: Challenges and opportunities for the future. *IEEE Robotics & Automation Magazine*, 14(1):43–52, March 2007. DOI: [10.1109/MRA.2007.339623](https://doi.org/10.1109/MRA.2007.339623).
- J5 **M. Moll** and L. E. Kavraki. Path planning for deformable linear objects. *IEEE Trans. on Robotics*, 22(4):625–636, August 2006. DOI: [10.1109/TRO.2006.878933](https://doi.org/10.1109/TRO.2006.878933).
- J4 P. Das, **M. Moll**, H. Stamati, L. E. Kavraki, and C. Clementi. Low-dimensional, free-energy landscapes of protein-folding reactions by nonlinear dimensionality reduction. *Proc. Natl. Acad. of Science USA*, 103(26):9885–9890, June 2006. DOI: [10.1073/pnas.0603553103](https://doi.org/10.1073/pnas.0603553103).

- J3 **M. Moll** and M. A. Erdmann. Manipulation of pose distributions. *Intl. J. of Robotics Research*, 21(3): 277–292, March 2002. DOI: [10.1177/027836402320556449](https://doi.org/10.1177/027836402320556449). (A slightly different version of this article was published as a book chapter; see below.)
- J2 **M. Moll**, K. Goldberg, M. A. Erdmann, and R. Fearing. Aligning parts for micro assemblies. *Assembly Automation*, 22(1):46–54, February 2002. DOI: [10.1108/01445150210416673](https://doi.org/10.1108/01445150210416673).
- J1 **M. Moll** and R. Miikkulainen. Convergence-zone episodic memory: Analysis and simulations. *Neural Networks*, 10(6):1017–1036, 1997. DOI: [10.1016/S0893-6080\(97\)00016-6](https://doi.org/10.1016/S0893-6080(97)00016-6).

#### BOOK CHAPTERS

- B4 R. Luna, M. Lahijanian, **M. Moll**, and L. E. Kavraki. Asymptotically optimal stochastic motion planning with temporal goals. In H. L. Akin, N. M. Amato, V. Isler, and A. F. van der Stappen, editors, *Algorithmic Foundations of Robotics XI*, volume 107 of *Springer Tracts in Advanced Robotics*, pages 335–352. Springer Verlag, 2015. DOI: [10.1007/978-3-319-16595-0\\_20](https://doi.org/10.1007/978-3-319-16595-0_20).
- B3 **M. Moll**, D. Schwarz, and L. E. Kavraki. Roadmap methods for protein folding. In M. Zaki and C. Bystroff, editors, *Protein Structure Prediction: Methods and Protocols*, Methods In Molecular Biology. Humana Press, second edition, October 2007. DOI: [10.1007/978-1-59745-574-9\\_9](https://doi.org/10.1007/978-1-59745-574-9_9).
- B2 **M. Moll** and M. A. Erdmann. Reconstructing the shape and motion of unknown objects with active tactile sensors. In J.-D. Boissonnat, J. Burdick, K. Goldberg, and S. Hutchinson, editors, *Algorithmic Foundations of Robotics V*, Springer Tracts in Advanced Robotics, pages 293–310. Springer Verlag, 2004. DOI: [10.1007/b80173](https://doi.org/10.1007/b80173).
- B1 **M. Moll** and M. A. Erdmann. Manipulation of pose distributions. In B. R. Donald, K. M. Lynch, and D. Rus, editors, *Algorithmic and Computational Robotics: New Directions*, pages 127–141. A. K. Peters, 2001. URL: <http://www.crcpress.com/product/isbn/9781568811253>.

#### REFEREED CONFERENCE PAPERS

- C40 W. Baker, Z. Kingston, **M. Moll**, J. Badger, and L. Kavraki. Robonaut 2 and you: Specifying and executing complex operations. In *IEEE Workshop on Advanced Robotics and its Social Impacts (ARSO)*, Austin, TX, 2017.
- C39 S. Butler, **M. Moll**, and L. E. Kavraki. A general algorithm for time-optimal trajectory generation subject to minimum and maximum constraints. In *Workshop on the Algorithmic Foundations of Robotics*, December 2016.
- C38 D. Devaurs, M. Papanastasiou, D. Antunes, J. Abella, **M. Moll**, D. Ricklin, J. Lambris, and L. E. Kavraki. Native state of complement protein C3d analyzed via hydrogen exchange and conformational sampling. In *Intl. Conf. on Intelligent Biology and Medicine (ICIBM)*, 2016.
- C37 J. D. Hernández, **M. Moll**, E. Vidal Garcia, M. Carreras, and L. E. Kavraki. Planning feasible and safe paths online for autonomous underwater vehicles in unknown environments. In *IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems*, pages 1313–1320, October 2016. DOI: [10.1109/IROS.2016.7759217](https://doi.org/10.1109/IROS.2016.7759217).
- C36 S. M. Kim, M. I. Peña, **M. Moll**, G. Giannakopoulos, G. N. Bennett, and L. E. Kavraki. An evaluation of different clustering methods and distance measures used for grouping metabolic pathways. In *Eighth International Conference on Bioinformatics and Computational Biology (BICoB)*, April 2016.
- C35 **M. Moll**, P. W. Finn, and L. E. Kavraki. Structure-guided selection of specificity determining positions in the human kinome. In *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pages 21–28, November 2015. DOI: [10.1109/BIBM.2015.7359650](https://doi.org/10.1109/BIBM.2015.7359650). **Winner of the best paper award.**
- C34 A. Novinskaya, D. Devaurs, **M. Moll**, and L. E. Kavraki. Improving protein conformational sampling by using guiding projections. In *IEEE Intl. Conf. on Bioinformatics and Biomedicine Workshops (BIBMW)*, pages 1272–1279, November 2015. DOI: [10.1109/BIBM.2015.7359863](https://doi.org/10.1109/BIBM.2015.7359863).

- C33 D. Coleman, I. A. Şucan, **M. Moll**, K. Okada, and N. Correll. Experience-based planning with sparse roadmap spanners. In *IEEE Intl. Conf. on Robotics and Automation*, pages 900–905, 2015. DOI: [10.1109/ICRA.2015.7139284](https://doi.org/10.1109/ICRA.2015.7139284).
- C32 C. Voss, **M. Moll**, and L. E. Kavraki. A heuristic approach to finding diverse short paths. In *IEEE Intl. Conf. on Robotics and Automation*, pages 4173–4179, 2015. DOI: [10.1109/ICRA.2015.7139774](https://doi.org/10.1109/ICRA.2015.7139774).
- C31 Z. Wang, Z. Wang, **M. Moll**, P.-S. Huang, D. Grady, N. Nasrabadi, T. Huang, L. Kavraki, and M. Hasegawa-Johnson. Active planning, sensing and recognition using a resource-constrained discriminant POMDP. In *IEEE/ISPRS Workshop on Multi-Sensor Fusion for Outdoor Dynamic Scene Understanding at CVPR*, 2014. DOI: [10.1109/CVPRW.2014.116](https://doi.org/10.1109/CVPRW.2014.116).
- C30 R. Luna, M. Lahijanian, **M. Moll**, and L. E. Kavraki. Optimal and efficient stochastic motion planning in partially-known environments. In *28th AAAI Conference on Artificial Intelligence (AAAI-14)*, pages 2549–2555, Québec City, Canada, July 2014. URL: <https://www.aaai.org/ocs/index.php/AAAI/AAAI14/paper/view/8457>.
- C29 R. Luna, M. Lahijanian, **M. Moll**, and L. E. Kavraki. Fast stochastic motion planning with optimality guarantees using local policy reconfiguration. In *IEEE Intl. Conf. on Robotics and Automation*, pages 3013–3019, 2014. DOI: [10.1109/ICRA.2014.6907293](https://doi.org/10.1109/ICRA.2014.6907293).
- C28 S. Nedunuri, S. Prabhu, **M. Moll**, S. Chaudhuri, and L. E. Kavraki. SMT-based synthesis of integrated task and motion plans from plan outlines. In *IEEE Intl. Conf. on Robotics and Automation*, pages 655–662, 2014. DOI: [10.1109/ICRA.2014.6906924](https://doi.org/10.1109/ICRA.2014.6906924).
- C27 S. Nedunuri, S. Prabhu, **M. Moll**, S. Chaudhuri, and L. E. Kavraki. Synthesis of plans for robots from plan outlines. In *Workshop on Planning and Robotics at ICAPS*, 2014.
- C26 D. K. Grady, **M. Moll**, and L. E. Kavraki. Combining a POMDP abstraction with replanning to solve complex, position-dependent sensing tasks. In *AAAI Fall Symposium*, Arlington, VA, November 2013. URL: <https://www.aaai.org/ocs/index.php/FSS/FSS13/paper/view/7578>.
- C25 J. Chyan, **M. Moll**, and L. E. Kavraki. Improving the prediction of kinase binding affinity using homology models. In *Computational Structural Bioinformatics Workshop at the ACM Conf. on Bioinf., Comp. Bio. and Biomedical Informatics*, pages 741–748, Washington, DC, September 2013. DOI: [10.1145/2506583.2506704](https://doi.org/10.1145/2506583.2506704).
- C24 B. Gipson, **M. Moll**, and L. E. Kavraki. Resolution independent density estimation for motion planning in high-dimensional spaces. In *IEEE Intl. Conf. on Robotics and Automation*, pages 2429–2435, 2013. DOI: [10.1109/ICRA.2013.6630908](https://doi.org/10.1109/ICRA.2013.6630908).
- C23 R. Luna, I. A. Şucan, **M. Moll**, and L. E. Kavraki. Anytime solution optimization for sampling-based motion planning. In *IEEE Intl. Conf. on Robotics and Automation*, pages 5053–5059, 2013. DOI: [10.1109/ICRA.2013.6631301](https://doi.org/10.1109/ICRA.2013.6631301).
- C22 D. K. Grady, **M. Moll**, and L. E. Kavraki. Automated model approximation for robotic navigation with POMDPs. In *IEEE Intl. Conf. on Robotics and Automation*, pages 78–84, 2013. DOI: [10.1109/ICRA.2013.6630559](https://doi.org/10.1109/ICRA.2013.6630559).
- C21 D. K. Grady, **M. Moll**, C. Hegde, A. C. Sankaranarayanan, R. G. Baraniuk, and L. E. Kavraki. Multi-robot target verification with reachability constraints. In *IEEE Intl. Symp. on Safety, Security, and Rescue Robotics*, 2012. DOI: [10.1109/SSRR.2012.6523873](https://doi.org/10.1109/SSRR.2012.6523873).
- C20 D. K. Grady, **M. Moll**, C. Hegde, A. C. Sankaranarayanan, R. G. Baraniuk, and L. E. Kavraki. Multi-objective sensor-based replanning for a car-like robot. In *IEEE Intl. Symp. on Safety, Security, and Rescue Robotics*, 2012. DOI: [10.1109/SSRR.2012.6523898](https://doi.org/10.1109/SSRR.2012.6523898).
- C19 D. K. Grady, **M. Moll**, C. Hegde, A. C. Sankaranarayanan, R. G. Baraniuk, and L. E. Kavraki. Look before you leap: Predictive sensing and opportunistic navigation. In *Workshop on Progress and Open Problems in Motion Planning at the IEEE/RSJ Conf. on Intelligent Robots and Systems*, 2011.

- C18 **M. Moll**, I. A. Şucan, J. Bordeaux, and L. E. Kavraki. Teaching motion planning concepts to undergraduate students. In *IEEE Workshop on Advanced Robotics and its Social Impacts (ARSO)*, 2011. DOI: [10.1109/ARSO.2011.6301976](https://doi.org/10.1109/ARSO.2011.6301976).
- C17 N. Haspel, **M. Moll**, M. L. Baker, W. Chiu, and L. E. Kavraki. Tracing conformational changes in proteins. In *IEEE Intl. Conf. on Bioinformatics and Biomedicine Workshops (BIBMW)*, pages 120–127, Washington, DC, November 2009. DOI: [10.1109/BIBMW.2009.5332115](https://doi.org/10.1109/BIBMW.2009.5332115).
- C16 V. Y. Fofanov, B. Y. Chen, D. H. Bryant, **M. Moll**, O. Lichtarge, L. E. Kavraki, and M. Kimmel. A statistical model to correct systematic bias introduced by algorithmic thresholds in protein structural comparison algorithms. In *IEEE Intl. Conf. on Bioinformatics and Biomedicine Workshops (BIBMW)*, pages 1–8, 2008. DOI: [10.1109/BIBMW.2008.4686202](https://doi.org/10.1109/BIBMW.2008.4686202).
- C15 **M. Moll** and L. E. Kavraki. LabelHash: A flexible and extensible method for matching structural motifs. In *Automated Function Prediction / BioSapiens Meeting (AFP-BioSapiens)*, Toronto, Canada, 2008. DOI: [10.1038/npre.2008.2199.1](https://doi.org/10.1038/npre.2008.2199.1). Available from Nature Precedings.
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## OTHER

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## INVITED TALKS

- University of Houston at Clear Lake. September 7, 2016. *Motion Planning: From Robots to Molecules*.
- Intl. Conf. on Automated Planning and Scheduling (ICAPS) Summer School, King’s College, London, UK. June 9, 2016. *Sampling-based motion planning and its combination with task planning*.
- University of Twente, the Netherlands. March 27, 2015. *Computing Robot Motion Plans from High-Level Specifications*.
- University of Utrecht, the Netherlands. March 26, 2015. *Computing Robot Motion Plans from High-Level Specifications*.
- University of Utrecht, the Netherlands. March 26, 2015. *Modeling Conformational Changes in Large Molecular Complexes*.
- Networking event for alumni of Dutch polytechnical universities, Houston, TX. November 21, 2014. *Motion Planning: From Robots to Molecules*
- Workshop on Robotics Methods for Structural and Dynamic Modeling of Molecular Systems at the Robotics Science & Systems (RSS) conference, July 12, 2014. *Motion Planning for Large Molecular Complexes*.
- Open Source Software World Challenge Awards Day, Seoul, Korea. November 27, 2012. *The Open Motion Planning Library*.
- HPC Workshop, Rice University. October 1, 2008. *HPC for Computational Structural Biology*.
- Texas A&M University. November 16, 2007. *Nonlinear Dimensionality Reduction for the Analysis of Protein Motion*.
- Information Sciences Institute, University of Southern California. May 21, 2005. *Manipulation and Shape Modeling for Robotics Applications*.
- Intl. Workshop on Motion Planning in Virtual Environments, Toulouse, France. January 8, 2005. *Applying Motion Planning Techniques to Molecular Docking*.

- Honda Research Institute, USA. December 13, 2004. *Manipulation and Shape Modeling for Robotics Applications*.
  - NASA Johnson Space Center. April 7, 2004. *Shape Reconstruction Using Active Tactile Sensors*.
  - NASA Ames Research Center. March 10, 2004. *Shape Reconstruction Using Active Tactile Sensors*.
  - INRIA Sophia-Antipolis, France. December 20, 2002. *Nonprehensile Manipulation and Sensing*.
  - Univ. of Mass. at Amherst. March 2, 2002. *Shape Reconstruction Using Active Tactile Sensors*.
  - Texas A&M University. March 21, 2002. *Shape Reconstruction Using Active Tactile Sensors*.
  - Johns Hopkins University. March 28, 2002. *Shape Reconstruction Using Active Tactile Sensors*.
  - Center for the Neural Basis of Cognition Brain Bag Seminar, Carnegie Mellon University. November 25, 1996. *Convergence-Zone Episodic Memory: Analysis and Simulations*.
  - Parallel Distributed Processing Group Meeting, Psychology Department, Carnegie Mellon University. November 15, 1996. *Convergence-Zone Episodic Memory: Analysis and Simulations*.
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## SCIENTIFIC SOFTWARE

- **The Open Motion Planning Library** (<http://ompl.kavrakilab.org>): a library containing implementations of many motion planning algorithms, as well as a simple GUI. With Ioan Şucan and many other developers. Used inside the **Robot Operating System (ROS)**. **Winner of the 2012 Open Source Software World Challenge**.
- **LabelHash** (<http://labelhash.kavrakilab.org>): a system that, given a small 3D protein substructure, finds all substructures in a large collection of proteins that are geometrically and chemically similar to it. With Drew Bryant.
- **MacPorts** (<http://www.macports.org>): maintainer of a number of scientific software ports for MacPorts, an Open Source package manager for OS X.