

CURRICULUM VITAE: Kirstin H. Petersen, Assistant Professor

Collective Embodied Intelligence Lab (www.cei.ece.cornell.edu)
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RESEARCH

I am interested in simple robotic solutions to complex problems, with a focus on bio-inspired design and coordination of robot collectives, as well as studies of their biological counterparts. Major research topics in my lab include swarm intelligence, embodied intelligence, autonomous construction, digital agriculture, bio-cyber physical systems, human-swarm interaction, and soft robot swarms. Although my work is centered in engineering, my close collaborators span entomology, plant sciences, and architecture.

EDUCATION

- 1. Ph.D., Computer Science**
Harvard University, USA. Advisor: Prof. Radhika Nagpal (rad@eecs.harvard.edu)
Dissertation: “Collective Construction by Termite-Inspired Robots”, September 2014
- 2. M.Sc., Computer Systems Engineering**
University of Southern Denmark, Denmark. Advisor: Prof. John Hallam (john@mmmi.sdu.dk).
Thesis: “Autonomous Construction of Temporary Human Habitats”, August 2008
- 3. B.Sc., Electro-technical Engineering**
Odense University College of Engineering, Denmark. Advisor: Staff Engineer, Mike Garrett.
Thesis with Jet Propulsion Laboratory, NASA: “Flexible Interface for LiiBy”, January 2006

PROFESSIONAL EXPERIENCE

- 1. Assistant Professor in ECE, Cornell University**
Director of the Collective Embodied Intelligence lab (CEI-lab). Field member of Computer Science, Systems Engineering, and Mechanical and Aerospace Engineering. August 1st 2016 – Present.
- 2. Fellow at the Max Planck ETH Center for Learning Systems**
Joint MPI and ETH Zurich initiative. July 2015 – July 2016.
- 3. Postdoctoral Fellow at the Max Planck Institute for Intelligent Systems, Lab of Prof. Metin Sitti**
November 2014 – July 2016
- 4. Researcher at Harvard University and the Wyss Institute, Lab of Prof. Radhika Nagpal.**
September 2009 – September 2012 (Research assistant, lab manager, and outreach coordinator).
September 2012 – September 2014 (Graduate student).
- 5. Researcher at University of Southern Denmark, Lab of Prof. John Hallam.**
Member of the EU-project, Cilia-bionics. September 2008 - August 2009.
- 6. Group Leader and Technical Designer at the Svenska Yrkeshögskolan, Nordplus.**
January 2006 - May 2006
- 1. Intern at Jet Propulsion Laboratory, NASA.** September 2004 – January 2005

HONORS AND AWARDS

1. Douglas Whitney '61 Excellence in Teaching Award, Cornell College of Engineering, 2022.
2. Cornell Engineering Research Excellence Award, Cornell University, 2021.
3. Aref and Manon Lahham Faculty Fellow, Cornell University, 2021-2026.
4. Packard Fellowship for Science and Engineering, 2019-2024.
5. Intl. collaborator of the new Cluster of Excellence for Integrative Computational Design, Fabrication and Construction for Architecture, (50ME) awarded to the University of Stuttgart, 2018-2028.
6. Research ranked among the top scientific innovations of the year by National Geographic, 2018.
7. Best Student Paper Award, Intl. Symposium on Distributed Autonomous Robotic Systems, Oct 2018.
8. Nominated for 3M Non-Tenure Faculty Award, October 2018.
9. On Robohub's list of 25 Amazing Women in Robotics to Know in 2018.
10. Early Career Faculty Champion Award, Cornell Office of Inclusion and Student Engagement, 2018.
11. Most read in July 2017, Advanced Materials Review paper (DOI: 10.1002/adem.201700016).
12. Disney Poster award, at Bits On Our Minds (BOOM), Cornell University, April 2017.
13. Poster award 'Best Project in Category', Cornell MEng Poster session, May 2017.
14. GETTY LAB micro-grants, USA 2014-2020
15. Elected fellow of the Elisabeth Schiemann Kolleg, Max Planck, 2016-ongoing.
16. Postdoctoral fellowship with the Max Planck Institute for Intelligent Systems, 2014-2016.
17. Research ranked 4th in Science Magazine's Top 10 Scientific Achievements of 2014
18. Foundation of Frimodt-Heineke, Denmark, 2007
19. Danish Society of Women, Denmark 2007
20. Foundation of Reinholdt W. Jorck and Spouse, Denmark 2006
21. Foundation of Balslev International Engineering Company, Denmark 2003

PROFESSIONAL ACTIVITIES

1. IEEE/RAS International Conference on Robotics and Automation (ICRA) workshop on Collective Robotic Construction, co-organizer, 2022.
2. ICRA workshop on Modular Self-Reconfigurable Robots, co-organizer, 2022.
3. Robotics panel at GrowNY, moderator, 2021.
4. IEEE/RAS International Conference on Soft Robotics (RoboSoft), workshop committee member, 2021.
5. Robotics panel at the Cornell Institute for Digital Agriculture annual workshop, organizer, 2021.
6. Joint International Symposium on Swarm Behavior and Bio-inspired Robotics (SWARM) - Annual Symposium for Distributed Autonomous Robotic Systems (DARS) Organized Session on Multi-Scale Instrumentation of Biological Swarms, co-organizer, 2021.
7. Workshop on Collective Embodied Intelligence at the Rockefeller University Field Center, co-organizer, August 2018.
8. Workshop on Swarms: From Biology to Robotics and Back at ICRA, co-organizer, May 2018.
9. Workshop on Distributed, Collective Computation in Biological and Artificial Systems at the Janelia Research Institute workshop, co-organizer, March 2018.
10. Workshop on Assembly and Coordination across the Scales at the Max Planck ETH Center for Learning Systems, co-organizer, June 2016.
11. 4-day Workshop on Swarmbot Assemblages at Smart Geometry, co-organizer, June 2016.
12. Max Planck ETH Center for Learning Systems Introductory Retreat, co-organizer, October 2015.
13. North East Robotics Colloquium (NERC2013) at Harvard University, co-organizer, October 2013.

PAPERS AND LECTURES PRESENTED EXTERNALLY

1. DARS, “Designing Robotic Systems with Collective Embodied Intelligence”, invited keynote, November 2022.
2. The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR), “Studying embodied intelligence in termites, bees, and robots”, invited speaker at the Multi-Agent Behavior (MABe) Workshop, June 2022.
3. Jet Propulsion Laboratory Multi-Agent Tech Talks, “Embodied Intelligence and Coordination in Bio-Inspired Robot Collectives”, invited speaker, June 2022.
4. Max Planck Institute and Schloss Ringberg, “Collective Embodied Intelligence in Robotic Systems”, invited keynote at the workshop on Shaping the Future of Robotics through Materials Innovation, June 2022.
5. Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS), “Deformable Modular Robots”, AIRS in the AIR seminar series on Modular Self-reconfigurable Robots, June 2022.
6. ICRA, “Motion in Soft Modular Robots”, invited speaker at the workshop on Challenges and Opportunities of Bio-inspired Design, Actuation, and Locomotion, May 2022.
7. Carnegie Mellon University, “Designing Robotic Systems with Collective Embodied Intelligence”, Robotics Institute colloquium speaker, April 2022.
8. University of Syracuse, “Designing Robotic Systems with Collective Embodied Intelligence”, College of Engineering colloquium speaker, April 2022.
9. Intl. Conference of Embodied Intelligence, “Embodied Intelligence in Multi-Robot Systems”, invited speaker, March 2022.
10. University of Pennsylvania, “Designing Robotic Systems with Collective Embodied Intelligence”, MEAM colloquium speaker, November 2021.
11. SWARM, “Automated Entrance Monitoring of Managed Bumble Bees”, oral paper presentation (online), July 2021.
12. Max Planck-ETH Center for Learning Systems summer retreat, “Collective Embodied Intelligence”, invited speaker, July 2021.
13. RoboSoft, “Collective Embodied Intelligence”, invited speaker at the workshop on Material Intelligence: From Functional Materials to Material Computing, April 2021.
14. Robosoft, “The Lower Hanging Fruit: An integrative approach to agricultural field robotics”, invited speaker at the Soft Robotics in Agriculture workshop, April 2021.
15. MIT and Stanford’s Robotics Today online seminar series, “Form, Function, and Robotic Superorganisms”, invited speaker, October 2020.
16. Packard Annual meeting, “Intelligence and Information Propagation in Natural and Robot Swarms”, invited lecture, September 2020.
17. EML iMechanica webinar, panelist, September 2020.
18. ICRA, “Deformable Modular Robots”, invited speaker at the Self-Assembling and Reconfigurable Systems workshop, May 2020.
19. 7th Annual Entomology Symposium at Cornell University, “Form, Function, and Robotic Superorganisms”, keynote speaker, January 2020.
20. DARS, “Scalable Compiler for the TERMES Distributed Assembly System”, oral paper presentation, April 2019.
21. Seven on Seven, “Robotics and AI and the natural world”, exhibit with the Rhizome at the New Museum in NYC, April 2019.
22. Georgia Tech, “Form, Function, and Robotic Superorganisms”, invited seminar, September 2018.

23. Danish Students Abroad (DSA CAREERS), “Academic Careers in Robotics”, invited talk at the Danish Ministry of Education, July 2018.
24. IEEE 3rd International Workshops on Foundations and Applications of Self* Systems (FAS* W), “Robots building bridges, not walls”, oral paper presentation, 2018.
25. PennState Pollinator Symposium, invited speaker, April 2018.
26. The First Northeast Regional Conference on Complex Systems (NERCCS), “Design of Robot Collectives”, invited keynote, April 2018.
27. RoboSoft, “Soft Robot Collectives”, invited speaker at the workshop on Soft Bodied Structures in Nature and Robots, April 2018.
28. Janelia Research Campus, “Leveraging Honey Bees as Bio-Cyber Physical Systems”, invited speaker at the workshop on Distributed, Collective Computation in Biological and Artificial Systems, March 2018.
29. Oregon State University, “Designing Robot Collectives”, invited speaker at the Robotics Colloquium, September 2017.
30. IEEE/RSJ International Conference on Robots and Intelligent Systems (IROS), “Collective Embodied Intelligence”, invited speaker at the Robotics-Inspired Biology workshop, September 2017.
31. R:SS, “Designing Robot Collectives”, invited speaker at the Women in Robotics Workshop, July 2017.
32. R:SS, “Designing Robot Collectives”, invited speaker at the workshop on Minimality and Trade-offs in Automated Robot Design, July 2017.
33. Harvard University, “Collective Embodied Intelligence”, invited seminar at the department of Electrical Engineering and Computer Science, July 2017.
34. Draper Labs, “Collective Embodied Intelligence”, invited seminar, July 2017.
35. ICRA, “Asymmetric Stable States in Inflated Dielectric Elastomer Actuators”, oral paper presentation, 2017.
36. Northeastern Robotics Colloquium (NERC2016), “Designing Robot Collectives”, invited keynote, October 2016.
37. Max Planck Institute for Intelligent Systems, “Designing Robot Collectives”, invited seminar, March 2016.
38. Carnegie Mellon University, “Designing Robot Collectives”, invited seminar at the School of Mechanical Engineering, February 2016.
39. Northwestern University, “Designing Robot Collectives”, invited seminar in the department of Mechanical Engineering, February 2016.
- University of Washington, “Designing Robot Collectives”, invited seminar at the department of Computer Science, February 2016.
40. Stanford University, “Designing Robot Collectives”, invited seminar at the department of Electrical Engineering, February 2016.
41. University of California San Diego, “Designing Robot Collectives”, invited seminar at the department of Mechanical Engineering, January 2016
42. Princeton University, “Designing Robot Collectives”, invited seminar at the department of Mechanical Engineering, July 2015.
43. International Conference on Pattern Recognition (ICPR), “3D Tracking of Building Processes in Macrotermes”, oral paper presentation at the workshop for Visual observation and analysis of Vertebrate And Insect Behavior, 2012.
44. R:SS, “TERMES: An Autonomous Robotic System for Three-Dimensional Collective Construction”, oral paper presentation, 2011.

REVIEWING ACTIVITIES

Science Robotics, AAAS; Science Advances, AAAS; Nature Scientific Reports; IEEE Transactions of Robotics; Robotics: Science and Systems (RSS); IEEE International Conference of Robotics and Automation (ICRA); IEEE/RSJ International Conference on Robots and Systems (IROS); International Conference on Advanced Robotics (ICAR); International Symposium on Distributed Autonomous Robotic Systems (DARS); IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO); IEEE International Conference Series on Cognitive Informatics and Cognitive Computing (ICCI-CC).

MEMBERSHIPS

1. IEEE membership 2016-ongoing.

PROFESSIONAL SOCIETIES

1. Elisabeth Schiemann Kolleg, Max Planck Gesellschaft, 2016-2022.

GRADUATE FIELDS

1. Field-member of Electrical and Computer Engineering, Cornell University (2016-current)
2. Field-member of Mechanical Engineering, Cornell University (2016-current)
3. Field-member of Computer Science, Cornell University (2016-current)
4. Field-member of Systems Engineering, Cornell University (2019-current)
5. Field-member of Aerospace Engineering, Cornell University (2018-current)

SERVICE ACTIVITIES

1. Cornell Institute for Digital Agriculture (CIDA), executive committee member, 2021-current.
2. Cornell ECE COVID-19 response with over 200 participants, co-organizer, Spring 2020.
3. Journal for Swarm Intelligence, editorial board member, 2020-current.
4. International Symposium on Multi-Robot and Multi-Agent Systems, area chair, 2019.
5. ACM Symposium on Computational Fabrication, area chair, 2019.
6. The Wiley journal of Advanced Intelligent Systems (AISY), member of the international advisory board, 2019-current.
7. IEEE Robotics Automation Letters (RA-L), associate editor, 2018-current.
8. Robotics: Science and Systems (R:SS), area chair, 2018.

SUMMARY OF EXTERNAL FUNDING

1. NSF-FRR: "CLB Supplement: CAREER: Environmentally-Mediated Coordination in Natural and Robot Swarms", \$63,609, 2022.
2. CIDA Research Innovation Fund, "Automated Monitoring of Strawberry Pollination", 2022, \$6,750.
3. Aref and Manon Lahham Faculty Fellowship, 2021-2026. \$50,000.
4. NSF grant #2042411. "CAREER: Environmentally-Mediated Coordination in Natural and Robot Swarms", 2021-2026, \$530,000.

5. Packard Fellowship for Science and Engineering, “Information and Intelligence Propagation in Robot and Natural Swarms”, 2019-2024. \$875,000.
6. NIFA Research Innovation Fund award. “Improving Strawberry Yield through Native and Robotic Pollinators”. PIs: K. Petersen, S. McArt, Cornell. 01-Oct-2019 to 30-Sep-2021. \$150,000.
7. NSF grant #1933284. “EAGER: Collaborative Research: Creation of Active Granular Materials and Study of Emergent Properties”. PIs: Prof. D. Goldman, Georgia Tech and K. Petersen. 03-Aug-2019 to 03-Aug-2021. \$150,000.
8. NIFA grant #2019-67021-29225. “CPS: TTP Option: Medium: Touch Sensitive Technologies for Improved Vineyard Management”. PIs: K. Petersen, K. Cox, A. Lal, J. Vanden Heuvel, R. Shepherd, Cornell. 01-Apr-2019 to 31-03-2022, \$1,191,236.
9. NSF grant #1830471. “NRI:INT: Ad-Hoc Collaborative Human-Robot Swarms”. PIs: H. Kress-Gazit, G. Hoffman, and K. Petersen, Cornell. 01-Sep-2018 to 31-Aug-2022, \$1,490,568.
10. GETTY LAB micro-grant. PI: K. Petersen, Cornell. 01-Jun-2018 to 31-Aug-2020, \$114,000.
11. NSF grant #1739671. “CPS: MEDIUM: Leveraging Honeybees as Bio-Cyber Physical Systems.” PIs: K. Petersen and A. Molnar, Cornell. 01-Sep-2017 to 31-Aug-2020, \$956,755.
12. NIFA grant #1014705. Cornell Digital Agriculture Initiative. “Improving Vineyard Management Using Touch Sensitive Soft Robots.” PIs: K. Petersen and J. Vanden-Heuvel, Cornell. 01-Oct-2017 to 01-Oct-2020, \$157,132.
13. McCormick Center for Teaching Excellence grant. “(ECE 3400) Intelligent Physical Systems, Course Redesign”. PI: K. Petersen, Cornell. 11-Jul-2017 to 14-Jun-2019, \$48,185.
14. 11 Cornell Engineering Learning Initiative Awards and Early Career Awards for work with undergraduate students, 2016-current, \$27,494 (total).

LIST OF COURSES TAUGHT

1. ECE 3400 “Intelligent Physical Systems” (2017 Fall, 98 students) (2018 Fall, 113 students)
2. ENGRG 1050 “Freshman Advising Class” (2018 Fall, 22 students)
3. ECE4960/5960 “Fast Robots” (2020 Fall, 15 students) (2022 Spring, 36 students)
4. ECE 6970/VIEN 4910 “Robots, Wine, and Food” (2020 Fall, 35 students)
5. ECE 6970/6680 “Multi-Agent Systems” (2016 Fall, 11 students) (2018 Spring 12 students) (2019 Spring, 18 students) (2020 Spring, 24 students) (2021 Spring, 13 students)

PUBLICATIONS

1. Jack A. Defay, Alexandra Nilles, and Kirstin Petersen. 2022. Collective Behaviors of Braitenberg Vehicles. *Accepted to Distributed Autonomous Robotic Systems (DARS)*.
2. Danna Ma, Jiahe Chen, Sadie Cutler, and Kirstin Petersen. 2022. Smarticle 2.0: Design of Scalable, Entangled Smart Matter. *Accepted to Distributed Autonomous Robotic Systems (DARS)*.
3. Phoebe Koenig and Kirstin Petersen. 2022. Best Practices for Instrumenting Honeybees. *Scientific Reports* 12, no. 1 (2022): 1-9.
4. Jiahe Chen and Kirstin Petersen. 2022. Decay-Based Error Correction in Collective Robotic Construction. *Presented at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*.
5. Haron Abdel-Raziq and Kirstin Petersen. "Automated Monitoring of Pollinators with Agricultural Robots." In 2022 8th International Conference on Automation, Robotics and Applications (ICARA), pp. 86-90. IEEE, 2022.

6. Jonathan Jaramillo, Justine Vanden Heuvel, Kirstin Petersen. 2022. Towards Low-cost, Vision-based Estimation of Yield and Crop Load in Vineyards. In ICRA 2022 Workshop on Agricultural Robotics and Automation, May 27, 2022, Philadelphia, PA.
7. Guarav Gardi†, Steven Ceron†, Wendong Wang, Kirstin Petersen, and Metin Sitti. Microrobot collectives with reconfigurable morphologies, behaviors, and functions. *Nature Commun* **13**, 2239 (2022). <https://doi.org/10.1038/s41467-022-29882-5>
8. Alexandra Nilles, Steven Ceron, Nils Napp, and Kirstin Petersen. “Strain-Based Consensus in Soft, Inflatable Robots”, In 2022 IEEE 5th International Conference on Soft Robotics (RoboSoft), pp. 789-794. IEEE, 2022.
9. Jack A. Defay, Jacob M. Peters, and Kirstin H. Petersen. "A customizable, low-cost alternative for distributed 2D flow sensing in swarms." *Artificial Life and Robotics* **27**, no. 2 (2022): 272-277.
10. Jingwen Du, Zach Brothers, Leah Valdes, Nils Napp, and Kirstin Petersen. “Automated Entrance Monitoring of Managed Bumble Bees”, in the *Journal of Artificial Life and Robotics*, ISSN: 1433-5298, DOI: 10.1007/s10015-022-00748-9 (2022).
11. Luyang Robby Huang, Alexander Zhu, Kathleen Wang, Daniel Goldman, Andy Ruina, and Kirstin Hagelskjaer Petersen. “Construction and Excavation by Collaborative Double-Tailed SAW Robots,” in *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 3742-3748, April 2022, doi: 10.1109/LRA.2022.3146562.
12. Kevin O’Keeffe, Steven Ceron, and Kirstin Petersen, “Collective behavior of swarmalators on a one-dimensional ring”, *Phys. Rev. E* **105**, 014211, DOI: 10.1103/PhysRevE.105.014211.
13. <https://ieeexplore.ieee.org/abstract/document/9593815>
14. Liu, Yutong, Justin Kuo, Kerik Cox, Justine Vanden Heuvel, Kirstin Petersen, and Amit Lal. "Imaging and Detection of Botrytis Cinerea with Gigahertz Ultrasonic Imager." In *2021 IEEE International Ultrasonics Symposium (IUS)*, pp. 1-4. IEEE, 2021.
15. Abdel-Raziq, Haron, Daniel Palmer, Alyosha Molnar, and Kirstin Petersen. "Mapping Unknown Environments With Instrumented Honey Bees." In *2022 International Conference on Robotics and Automation (ICRA)*, pp. 2330-2336. IEEE, 2022.
16. Paul Bardunias, Alli Nilles, Remi Greenberg, Daniel Goldman, and Kirstin Petersen, “Emergent tunnel branching in *Coptotermes formosanus* (Shiraki) through group interaction and stigmergic signalling”, abstract presented at Society of Integrative and Comparative Biology Annual Meeting (SICB), 2021.
17. Jacob M. Peters, Jonathan Jaramillo, and Kirstin Petersen, “An adaptable approach to multiple animal tracking in Python”, abstract presented at Society of Integrative and Comparative Biology Annual Meeting (SICB), 2021.
18. Haron Abdel-Raziq and Kirstin Petersen. "Automated Monitoring of Pollinators with Agricultural Robots." In 2022 8th International Conference on Automation, Robotics and Applications (ICARA), pp. 86-90. IEEE, 2022.
19. Michael L Smith, Nils Napp, and Kirstin H. Petersen. “Imperfect comb construction reveals the architectural abilities of honeybees” *PNAS* August 3, 2021 **118** (31).
20. Steven Ceron, Marta A. Kimmel, Alexandra Nilles and Kirstin H. Petersen, “Soft Robotic Oscillators with Strain-Based Coordination,” in *IEEE Robotics and Automation Letters*, vol. 6, no. 4, pp. 7557-7563, Oct. 2021, doi: 10.1109/LRA.2021.3100599.
21. Jonathan Jaramillo, Andrew Lin, Emma Sung, Isabel Jane Hunt Richter, and Kirstin Petersen. “Mobile, Inflatable Interface to Support Human Robot Interaction Studies,” *2021 18th International Conference on Ubiquitous Robots (UR)*, 2021, pp. 320-325, doi: 10.1109/UR52253.2021.9494648.
22. Jiahe Chen†, Yifang Liu†, Adam Pacheck†, Hadas Kress-Gazit, Nils Napp, and Kirstin Petersen. (2022) Errors in Collective Robotic Construction. In: *Distributed Autonomous Robotic Systems. DARS 2021. Springer Proceedings in Advanced Robotics*, vol 22. Springer, Cham. https://doi.org/10.1007/978-3-030-92790-5_21.
23. Jonathan Jaramillo, Justine Vanden Heuvel, and Kirstin Petersen. “Low-Cost, Computer Vision-Based, Prebloom Yield Prediction in Vineyards”, *Front. Agron.*, doi: 10.3389/fagro.2021.648080, 2021.

24. Haron Abdel-Raziq, Daniel Palmer, Phoebe Koenig, Alyosha Molnar, and Kirstin Petersen. "System design for inferring colony-level pollination activity through miniature bee-mounted sensors", *Sci Rep* **11**, 4239 (2021).
25. Andrea Ling, Mahshid Moghadasi, Kowin Shi, Jungshien Wei, and Kirstin Petersen. "Formica Forma: Explorations in Insect-Robot Collaboration for Emergent Design & Manufacturing", in proceedings of the 40th annual conference of the association of computer aided design in architecture, ACADIA 2020: Distributed Proximities, book I, p 312.
26. Nialah J. Wilson†, Steven Ceron†, Logan Horowitz, and Kirstin H. Petersen. "Scalable and Robust Fabrication, Operation, and Control of Compliant Modular Robots", *Scientific Frontiers* special issue on Designing Self-Organization in the Physical Realm, doi: 10.3389/frobt.2020.00044, 2020.
27. Phoebe A. Koenig, Michael L. Smith, Logan H. Horowitz, Daniel M. Palmer, and Kirstin Petersen. "Artificial shaking signals in honey bee colonies elicit natural responses", *Scientific Reports* **10**, 3746 (2020).
28. Danna Ma†, Steven Ceron†, Gregory Kaiser, and Kirstin Petersen. "Simple, low-cost fabrication of soft sensors for shape reconstruction." *IEEE Robotics and Automation Letters* **5**, no. 3 (2020): 4049-4054.
29. Jacob M. Peters and Kirstin Petersen, "Honeybee swarms use a flow-mediated pheromone signaling scheme to coordinate aggregation", abstract presented at Society of Integrative and Comparative Biology Annual Meeting (SICB), 2020.
30. Yawen Deng, Yiwen Hua, Nils Napp, and Kirstin Petersen, "Scalable Compiler for the TERMES Distributed Assembly System." *Robotics and Autonomous Systems Journal*, <https://doi.org/10.1016/j.robot.2019.07.010>, July 2019.
31. Steven Ceron, Nialah Wilson, Logan Horowitz, and Kirstin Petersen. "Comparative Analysis of Sensors in Rigid and Deformable Modular Robots for Shape Estimation." In 2019 International Symposium on Multi-Robot and Multi-Agent Systems (MRS), pp. 252-258. IEEE, 2019.
32. Steven Ceron, Logan Horowitz, Nialah Wilson, Claire Chen, Daniel Kim, and Kirstin Petersen. "Towards a Scalable, Self-Reconfigurable Robot with Compliant Modules." In 2019 International Symposium on Multi-Robot and Multi-Agent Systems (MRS), pp. 47-49. IEEE, 2019.
33. Timothy Duggan, Logan Horowitz, Asena Ulug, Emilie Baker, and Kirstin Petersen. "Inchworm-inspired locomotion in untethered soft robots." In 2019 2nd IEEE International Conference on Soft Robotics (RoboSoft), pp. 200-205. IEEE, 2019.
34. Kirstin H. Petersen, Nils Napp, Robert Stuart-Smith, Daniela Rus, and Mirko Kovac. "A review of collective robotic construction." *Science Robotics*, 13 Mar 2019: Vol. 4, Issue 28, DOI: 10.1126/scirobotics.aau8479.
35. Kirstin H. Petersen and Robert F. Shepherd. "Fluid-driven intrinsically soft robots." In *Robotic Systems and Autonomous Platforms*, pp. 61-84. Woodhead Publishing, 2019.
36. Yawen Deng, Yiwen Hua, Nils Napp, and Kirstin Petersen, "Scalable Compiler for the TERMES Distributed Assembly System." *Distributed Autonomous Robotic Systems*. Springer, Cham, 2019. 125-138. Best Student Paper Award.
37. Yiwen Hua, Yawen Deng, and Kirstin Petersen, "Robots building bridges, not walls." In *2018 IEEE 3rd International Workshops on Foundations and Applications of Self* Systems (FAS* W)* (pp. 154-159). IEEE.
38. Chaim C. Futran, Steven Ceron, Benjamin C. Mac Murray, Robert F. Shepherd, and Kirstin H. Petersen. "Leveraging fluid resistance in soft robots." In 2018 IEEE International Conference on Soft Robotics (RoboSoft), pp. 473-478. IEEE, 2018.
39. Steven Ceron, Aleena Kurumunda, Eashan Garg, Mira Kim, Tosin Yeku, and Kirstin Petersen. "Popcorn-driven robotic actuators." In 2018 IEEE International Conference on Robotics and Automation (ICRA), pp. 4271-4276. IEEE, 2018.
40. Kirstin Petersen and Radhika Nagpal. "Complex Design by Simple Robots: A Collective Embodied Intelligence Approach to Construction." *Architectural Design* **87.4** (2017): 44-49.
41. P. Polygerinos, N. Correll, S. Morin, B. Mosadegh, C. Onal, K. Petersen, M. Cianchetti, M. Tolley, and R. Shepherd. "Soft Robotics: Review of Fluid-Driven Intrinsically Soft Devices; Manufacturing,

- Sensing, Control, and Applications in Human-Robot Interaction”. *Advanced Materials* (2017). DOI: 10.1002/adem.201700016.
42. Alexander Spröwitz, Chantal Göttler, Ayush Sinha, Corentin Caer, Mehmet Uğur Öoztekin, Kirstin Petersen, and Metin Sitti. "Scalable pneumatic and tendon driven robotic joint inspired by jumping spiders." In 2017 IEEE International Conference on Robotics and Automation (ICRA), pp. 64-70. IEEE, 2017.
 43. Lindsey Hines, Kirstin Petersen, and Metin Sitti. "Asymmetric stable deformations in inflated dielectric elastomer actuators." In 2017 IEEE International Conference on Robotics and Automation (ICRA), pp. 4326-4331. IEEE, 2017.
 44. Lindsey Hines[†], Kirstin Petersen[†], Gou Zhan Lum, and Metin Sitti. "Soft Actuators for Small-Scale Robotics." *Advanced Materials* (2016): 1521-4095. DOI: 10.1002/adma.201603483.
 45. David Andréen, Petra Jennings, Nils Napp, and Kirstin Petersen. "Emergent Structures Assembled by Large Swarms of Simple Robots." In ACADIA//2016: POSTHUMAN FRONTIERS: Data, Designers, and Cognitive Machines: Proceedings of the 36th Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA), pp. 54-61. 2016.
 46. Lindsey Hines[†], Kirstin Petersen[†], and Metin Sitti, "Inflated Soft Actuators with Reversible Stable Deformations," *Advanced Materials Communications*, DOI: 10.1002/adma.201600107, 2016.
 47. Kirstin Petersen, Paul Bardunias, Nils Napp, Justin Werfel, Radhika Nagpal, & Scott Turner, "Arrestant property of recently manipulated soil on *Macrotermes michaelseni* as determined through visual tracking and automatic labeling of individual termite behaviors," *Journal of Behavioral Processes*, vol. 116: 8-11, 2015.
 48. Justin Werfel, Kirstin Petersen, and Radhika Nagpal, "Designing collective behavior in a termite-inspired robot construction team," *Science*, 343(6172):754-758, 2014. Voted among the top ten Scientific Breakthroughs of 2014 by Science.
 49. Kirstin Petersen, Nils Napp, Jaohe Chin-Lee, Justin Werfel, and Radhika Nagpal, "3D Tracking of Building Processes in *Macrotermes*," *VAIB Workshop, Intl. Conference on Pattern Recognition (ICPR)*, 2012.
 50. Kirstin Petersen, Justin Werfel, and Radhika Nagpal, "TERMES: An Autonomous Robotic System for Three-Dimensional Collective Construction," *Robotics: Science and Systems Conference (RSS)*, 2011. DOI: 10.15607/RSS.2011.VII.035.
 51. J. Werfel, K. Petersen, & R. Nagpal, "Distributed Multi-Robot Algorithms for the TERMES 3D Collective Construction System," *Workshop, Intl. Conference on Robots and Systems (IROS)*, 2011.

[†]Equally contributing first authors.