Rong Long

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EDUCATION

PhD in Theoretical and Applied Mechanics 01/2011
Sibley School of Mechanical and Aerospace Engineering, Cornell University

B.S. in Theoretical and Applied Mechanics 07/2006
Department of Modern Mechanics, University of Science and Technology of China

EXPERIENCE

Associate Professor 08/2021 – present
Lyall Faculty Fellow 07/2019 – 06/2027
Assistant Professor 09/2014 – 08/2021
Department of Mechanical Engineering, University of Colorado Boulder
Research interests:

- Fracture and large deformation of soft materials.
- Adhesion, friction, and contact mechanics.
- Mechanics of soft active materials and structures.
- Mechanics of composite materials.

Assistant Professor 01/2013 – 08/2014
Department of Mechanical Engineering, University of Alberta

Research Associate 01/2012 – 12/2012
Department of Mechanical Engineering, University of Colorado Boulder
Advisor: Martin L. Dunn

Postdoctoral Associate 01/2011 – 12/2011
Department of Biological and Environmental Engineering, Cornell University
Advisors: Mingming Wu & Chung-Yuen Hui

HONORS & AWARDS

- 2022 Outstanding Research Award, Mechanical Engineering, CU Boulder.
- 2021 Research & Innovation Office (RIO) Faculty Fellow, CU Boulder.
- 2020 Woodward Outstanding Faculty Award, Mechanical Engineering, CU Boulder.
- 2020 Provost's Faculty Achievement Award, CU Boulder.
- 2019 Lyall Faculty Fellowship, College of Engineering and Applied Science, CU Boulder.
- 2018 Faculty Early Career Development (CAREER) Award, National Science Foundation.
- 2018 ESPCI Paris-Michelin Visiting Professorship, ESPCI Paris and Michelin Company.
- 2017 Outstanding Undergraduate Educator Award, Mechanical Engineering, CU Boulder.

- 2017 3M Non-Tenured Faculty Award, 3M Company.
- 2016 ESPCI Paris-Michelin Visiting Professorship, ESPCI Paris and Michelin Company.
- 2015 Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities.
- 2014 Outstanding Young Adhesion Scientist Award, Adhesion Society.
- 2009 Liu Memorial Award, Cornell University.
- 2006 McMullen Fellowship, Cornell University.
- 2005 Guo Moruo Presidential Award, University of Science and Technology of China.
- 2004 Samsung Fellowship, University of Science and Technology of China.

PROFESSIONAL ACTIVITIES

Proposal Reviewer:

- Panelist, NSF, CMMI, 2012, 2016, 2017, 2018, 2019, 2021, 2022, 2023, 2024.
- Reviewer, European Research Council, 2021.
- Reviewer, NSERC, Canada, Discovery Grant, 2013, 2019, 2020.
- Reviewer, DOE BES, 2020.
- Reviewer, ACS Petroleum Research Fund, 2019.

Editor:

- Guest Editor: Mechanics of Materials (Special Issue*: Fracture, damage and adhesion in soft materials*), 2020-2021.
- Editorial Board: Scientific Reports, 2016 – 2019.

Conferences:

- Session Chair: Soft Tribology, 2021 Adhesion Society Annual Conference (Online), February 22-25, 2021.
- Session co-Organizer: Mechanics of Polymers with Dynamic Bonds, Society of Engineering Science 53rd Annual Technical Meeting, College Park, MD, October 2-5, 2016.
- Session co-Organizer: Mechanical Characterization of Soft Materials, 2016 ASME International Mechanical Engineering and Exposition, Phoenix, AZ, November 11-17, 2016.
- Session Chair: Contact Mechanics and Fracture, 2014 Adhesion Society Annual Conference, San Diego, CA, February 23-26, 2014.
- Discussion leader: Gordon Research Conference on Adhesion Science, South Hadley, MA, July 14-19, 2013.
- Chair: Gordon Research Seminar on Adhesion Science, Lewiston, ME, July 23-24, 2009

Journal & Conference Reviewer:

- *Journal Reviewer*:

ACS Applied Engineering Materials
ACS Applied Materials & Interfaces;
ACS Applied Polymer Materials;
ACS Macro Letters;
Acta Biomaterialia;
Advanced Functional Materials;
Advanced Intelligent Systems;
Advanced Materials;
Journal of Mechanical Engineering Science;
Journal of Mechanics of Materials & Structures;
Journal of Physics D: Applied Physics;
Journal of Rheology;
Journal of the Mechanics and Physics of Solids;
Journal of the Royal Society Interface;
Langmuir;
Macromolecules;

Advanced Materials Interfaces;
Advanced Science;
Applied Physics Letters;
ASME Journal of Applied Mechanics;
ASME J. Engineering Materials & Technology;
ASME Pressure Vessels & Piping Conference;
Biomechanics & Modeling in Mechanobiology;
Biosensors;
Engineering Fracture Mechanics;
Experimental Mechanics;
Extreme Mechanics Letters;
International Journal of Fracture;
International Journal of Mechanical Science;
International Journal of Solids and Structures;
Journal of Adhesion;
Journal of Adhesion Science and Technology;
Journal of Applied Polymer Science;
Journal of Biomechanics;
Materials Horizons;
Materials Today;
Meccanica;
Mechanics Research Communications;
National Science Review;
Physics Review Fluids;
Physics Review Letters;
Proceedings of the National Academy of Science;
Polymer;
Proceedings of the Royal Society A;
Reports on Progress in Physics;
RSC Advances;
Science Advances;
Soft Matter;
Soft Robotics;
Smart Materials and Structures;
Theoretical and Applied Fracture Mechanics;
ZAMM.

Consulting:

- Consultant for 3M company, 2019- 2020.

Membership:

- Adhesion Society.
- Society of Engineering Science

SERVICE

Department

- Department Graduate Committee, 10/2014-05/2019, 08/2020-05/2023
  - Search committee for Senior Graduate Academic Advisor, 2021.
  - Faculty lead for developing the certificate on Advanced Mechanics & Failure Analysis, 2020-2021.
  - Organizer of the Mechanics PhD prelim exam, 2023, 2020, 2016, 2015.
  - Organizer of the Materials PhD prelim exam, 2018, 2017.
  - Faculty representative for GEARRS organizing committee, September 2016-March 2017.
  - Organizer of Mechanical Engineering Graduate Seminar Series, January-December 2015.
- Department External Relation and Research Committee, 08/2019-05/2020, 08/2023-05/2024
- Department Search Committee, 2015, 2016, 2023, 2024, 2025
  - Chair of the computational engineering faculty search committee, 2024-2025.
  - Chair of the materials faculty search committee, 2023-2024.

College

- Engineering Proposal Review Committee, 05/2020-05/2022

Campus

- Executive Advisory Council, Graduate School of CU Boulder, 11/2022-present
- Provost's Faculty Achievement Awards Committee, 03/2021-08/2022

Professional Society

- Member-at-Large, Adhesion Society, 02/2020-02/2024
- University Liaison Officer, ASME Northern Alberta Section, 07/2013-08/2014

Thesis Committee

- Member of PhD research prelim exam committee for
  - Sai Yelishala, Mohammad Habibi, Prakhar Bandil, 2023
  - Charlotte Thomas, Hannah Larson, Kenichiro Yokota, Zachariah Irwin, Samuel Lamont, 2022.
  - Ryan Vanfleet, Jorge Miguel Osio-Norgaard, 2021.
  - Lawrence Smith, Olivia McIntee, Rosa Morales, Victor Cuevas, 2020.
  - Kristin Calahan, Adrienne Blevins, Karan Dikshit, Leah Bowen, Brodie Hoyer, 2019.
  - Kevin Eckstein, Karl Johannes, Andrew Tomaschke, Vidyacharan Venkata, 2018
  - Kristen Genter, Shankar Sridhar, Tong Shen, Masoud Aghajani, Andres Villada, 2017.
- Member of PhD comprehensive exam committee for
  - Kenichiro Yokota, Lawrence Smith, Spencer Dansereau, Saurabh Das, Samuel Lamont, 2023
  - Brodie Hoyer, Jorge Miguel Osio-Norgaard, Victor Crespo, Ajay Harihara Sharma, 2022.
  - Emanuele Sortino, Kevin Eckstein, Adrienne Blevins, Bhavya Senwar, 2021.
  - Kristin Calahan, Karl Johannes, Ashray Venkat Parameswar, Mitul Sisodiya, Robert Wagner, Leah Bowen, 2020.
  - Tong Shen, Xiang Zhou, Andres Villada, Ali Nematollahisarvestani, 2019.
  - Zhanan Zou, Mengyuan Wang, Nancy Sowan, Shankar Sridhar, 2018
  - Eduard Cerda, David Stobbe, 2017.
  - Eric Kramer, Joseph Wahlquist, Douglas Fankell, Chelsea Heveran, 2016.
  - Yu Wang, Zhengwei Li, Madalyn Kern, Curt Hansen, 2015.
  - Michael Stender, Lewis Cox, 2014.
- Member of PhD defense committee for
  - Yasara Dharmadasa, Lawrence Smith, Victor Crespo, Kenichiro, Yokato, Ajay Sharma, 2023.
  - Brodie Hoyer, Jorge Miguel Osio-Norgaard, Rosa Edith Morales, Jaylene Martinez, Robert Wagner, Bhavya Senwar, Kevin Eckstein, 2022.
  - Leah Bowen, Xiang Zhou, Karl Johannes, Ashray Venkat Parameswar, Kristin Calahan, 2021.
  - Peter Siegfried, Andres Villada, Shankar Sridhar, Tong Shen, Ali Nematollahisarvestani, 2020.
  - Mengyuan Wang, Zanan Zou, Masoud Aghajani, 2019.
  - David Stobbe, Eduard Cerda, 2018.
  - Chelsea Heveran, Douglas Fankell, Joseph Wahlquist, 2017.
  - Curt Hansen, Eric Kramer, Madalyn Kern, Yu Wang, Zhengwei Li, 2016.
  - Michael Stender, Lewis Cox, 2015.
  - Narasimha Boddeti, 2014.
- Member of MSc thesis committee for
  - Jacob Tersigni, Meher Gudela, 2023.
  - Kensei Iglesias, Noah Sonne, 2020.
  - Arpan Kumar Sahoo, Yimeng Liu, 2019.
  - Savina Balcells, Zachary White, Hongtian Zhu, Jian Kan, 2018.
  - Nate Margolis, Chengpu Zhu, 2017.

POSTDOCS AND STUDENTS SUPERVISED

Current Postdocs and Graduate Students

- Guillaume Gilles Lostec, PhD student, 2022-present, CU.
- Hendrik Kohlwes, PhD student, 2022-present, CU.
- Huiqi Shi, PhD student, 2022-present, CU.
- Hemant Sethi, PhD student, 2024-present, MSc student, 2022-2023, CU.

Alumni

- Xinwei Yang, PhD student, 2019-2024, CU.
  - Thesis: "*Nonlinear mechanics of contact, adhesion and fracture in highly stretchable elastomeric membranes*".
  - Received the ***Alan Gent Distinguished Student Paper Award and Peebles Award*** from the Adhesive Society for his paper "*Intrinsic fracture toughness of a viscoelastic pressure sensitive adhesive (PSA) film*" in 2024.
- Saleh Alzughaibi, PhD student, 2019-2024; MSc student, 2018-2019, CU.
  - Thesis: "*Experimental characterization of the fracture behavior of soft rubbers*".
- Salil Rababe, PhD, 2018-2023, CU.
  - Thesis: "*Three-dimensional fracture mechanics of elastomers*".
- Yinan Lu, PhD, 2017-2021; MSc student, 2015-2017, CU.
  - Thesis: "*Fracture and damage of soft elastomers and composites*".
- Qiang Guo, Postdoc, 2019-2021, CU.
  - Research Project: "*Crack growth in soft materials under cyclic loading*".
- Xiaohao Sun, Postdoc, 2019-2020, Visiting PhD student, 2018, 2017 and 2016, CU.
  - Research Project: "*Finite element modeling of adhesion and contact mechanics in soft materials and flexible structures*".
- Luxia Yu, PhD, 2015-2020, CU.
  - Thesis: "*Covalent adaptable network powder fusion: numerical simulation and application in fiber reinforced composites*".
- Yuan Qi, PhD, 2015-2020, CU.
  - Thesis: "*Fracture and contact mechanics of soft materials: theory and experiment*".
- Shawn Lavoie, PhD, 2013-2018, University of Alberta.
  - Thesis: "*Fracture modeling in elastomeric materials: relating the macroscopic response to microscopic processes*", (Co-supervised with Tian Tang).
- Tamran Lengyel, PhD, 2012-2015, University of Alberta.
  - Thesis: "*Investigation of the tearing mechanism of bonded soft elastomers with finite interfacial friction*" (Co-supervised with Peter Schiavone starting in July 2013).
- Wanru Liu, MSc, 2013-2015, University of Alberta.
  - Thesis: "*Constructing continuous strain and stress fields from spatially discrete displacement measurements in soft materials*".
- Cheng Zhang, Visiting PhD student, 2018-2019, CU.
- Peiran Ding, Undergraduate researcher, 2018-2019, CU.
- Mingxuan Li, Undergraduate researcher, 2018-2019, CU.
- Dayu Huang, Undergraduate researcher, 2019, CU.
- Michely Tenardi, Undergraduate researcher, 2018-present, CU.

- Sean Sundberg, Undergraduate researcher, 2017-2018, CU.
- Jacob Salter, Undergraduate researcher, 2016-2017, CU.
- Dongyu Wu, Undergraduate researcher, 2016-2017, CU.
- Xinxian Wang, Undergraduate researcher, 2015-2016, CU.
- Chun Yuan, Undergraduate researcher, 2015-2016, CU.

TEACHING

Department of Mechanical Engineering, University of Colorado Boulder

Courses taught, average student evaluation, and number of students

- MCEN 2063 – *Mechanics of Solids* (**/5.0, 95**) 01-05/2025
- MCEN 5228 –*Fracture Mechanics* (**/5.0**, **14**) 01-05/2024
- MCEN 2043 – *Dynamics* (**/5.0, 60**) 08-12/2023
- MCEN 5183 – *Mechanics of Composite Materials* (/**5.0**, **14**) 08-12/2023
- MCEN 2063 – *Mechanics of Solids* (**/5.0, 70**) 01-05/2023
- MCEN 2043 – *Dynamics* (**4.6/5.0, 18**) 08-12/2022
- MCEN 5228 –*Fracture Mechanics* (**4.6/5.0**, **11**) 08-12/2022
- MCEN 2043 – *Dynamics* (**4.1/5.0, 72**) 01-05/2022
- MCEN 6228 –*Wetting, Friction & Adhesion*, co-teach with Prof. Yifu Ding (**4.7/5.0**, **9**) 08-12/2021
- MCEN 5228 –*Fracture Mechanics* (**4.8/5.0**, **9**) 08-12/2021
- MCEN 2043 – *Dynamics* (**4.6/5.0, 72**) 01-05/2021
- MCEN 4183/5183 – *Mechanics of Composite Materials* (**4.8**/**5.0**, **22**) 01-05/2021
- MCEN 5228 – *Fracture Mechanics* (**4.7/5.0**, **11**) 08-12/2020
- MCEN 2043 – *Dynamics* (**4.3/5.0, 140**) 01-05/2020
- MCEN 4183/5183 – *Mechanics of Composite Materials* (**5.8**/**6.0**, **33**) 08-12/2019
- MCEN 5228 – *Fracture Mechanics* (**5.9/6.0**, **18**) 01-05/2019
- MCEN 2043 – *Dynamics* (**5.4/6.0, 132**) 08-12/2018
- MCEN 4183/5183 – *Mechanics of Composite Materials* (**5.4/6.0, 32**) 01-05/2018
- MCEN 5023/ASEN 5023 – *Solid Mechanics I* (**5.4/6.0, 45**) 08-12/2017
- MCEN 2043 – *Dynamics* (**5.0/6.0, 128**) 08-12/2017
- MCEN 4228/5228 – *Mechanics of Composite Materials* (**5.8/6.0, 29**) 01-05/2017
- MCEN 2043 - *Dynamics* (**5.0/6.0, 128**) 01-05/2017
- MCEN 4228/5228 – *Mechanics of Composite Materials* (**5.5/6.0, 22**) 01-05/2016
- MCEN 2043 - *Dynamics* (**5.4/6.0, 103**) 08-12/2015
- MCEN 2043 - *Dynamics* (**5.1/6.0, 109**) 01-05/2015

Department of Mechanical Engineering, University of Alberta

Courses taught, median student evaluation, and number of students

- MEC E 250 - *Engineering Mechanics II: Rigid Body Dynamics* (**4.8/5.0, 46**) 01-04/2014
- MEC E 380 - *Advanced Strength of Materials I* (**4.4/5.0, 120**) 09-12/2013

PUBLICATIONS

(Underline: Graduate Student or Postdoc Advised or co-Advised)

1. G. Lostec, J. Caillard, D. Colombo, **R. Long**, 2025, "A theory of fatigue fracture in viscoelastic solids", *Journal of the Mechanics and Physics of Solids,* published online.

2. X. Yang, H. Shi, Y. Qi, **R. Long**, 2025, "Interfacial cavitation during peeling of soft viscoelastic adhesives", *International Journal of Fracture*, published online.
3. S. Alzughaibi, J. Caillard, D. Colombo, **R. Long**, 2025, "Energy dissipation during crack growth in rubbers with Mullins softening", *Advanced Engineering Materials,* published online.
4. X. Yang, M. Wald, R. Birringer, J. Kemling, A. Hedegaard, J. Martin, J. Clapper, **R. Long**, 2024, "Intrinsic fracture toughness of a soft viscoelastic adhesive", *Journal of the Mechanics and Physics of Solids*, **192**, 105797.

   Alan Gent Distinguished Student Paper Award, The Adhesion Society, 2024
5. Y. Qi[#], X. Li[#], (#: equal contribution), S. Pamulapharthi Venkata, X. Yang, T. Sun, C.Y. Hui, J.P. Gong, **R. Long**, 2024, "Mapping deformation and dissipation during fracture of soft viscoelastic solid", *Journal of the Mechanics and Physics of Solids,* **186**, 105595.
6. N. Xue, **R. Long**, E.R. Dufresne, R.W. Style, 2024, "Elastomers fail from the edge", *Physical Review X,* **14**, 011054.
7. K. N. Calahan, K. G. Johannes, X. Yang, **R. Long**, M.E. Rentschler, 2024, "Density of micro-pillar array influences shear traction of individual pillars on soft substrates", *ACS Applied Engineering Materials*, **2**, 1-9.
8. C. Lee, H. Shi, J. Jung, B. Zheng, K. Wang, R. Tutika, **R. Long**, B.P. Lee, G. Gu, M.D. Bartlett, 2023, "Bioinspired materials for underwater adhesion: pathways to switchability", *Cell Reports Physical Science*, **4**, 101597.
9. R. Annapooranan, S.S. Jeyakumar, R. Chambers, **R. Long**, S. Cai, 2023, "Ultra rate-sensitive pressure sensitive adhesives enabled by soft elasticity of liquid crystal elasto*mers", Advanced Functional Materials,* **34**, 2309123.
10. Z. Yang, G. Bao, R. Huo, S. Jiang, X. Yang, X. Ni, L. Mongeau, **R. Long**, J. Li, 2023, "Programmable hydrogel adhesion with engineered network topology", *Proceedings of the National Academy of Sciences*, **120**, e2307816120.
11. X. Yang, A. Srivastava, **R. Long**, 2023, "Adhesive contact of an inflated circular membrane with curved surfaces", *International Journal of Solids and Structures,* **279**, 112371.
12. D. Hwang, C. Lee, X. Yang, J.M. Pérez-González, J. Finnegan, B. Lee, E.J. Markvicka, **R. Long**, M.D. Bartlett, 2023, "Metamaterial adhesives for programmable adhesion through reverse crack propagation", *Nature Materials*, **22**, 1030-1038.

    Distinguished Paper Award, The Adhesion Society, 2023.
13. J.D. Glover[#], X. Yang[#], (#: equal contribution), **R. Long**, J.T. Pham, 2023, "Creasing in microscale, soft static friction", *Nature Communications,* **14**, 2362.
14. L. Bowen, **R. Long**, M.E. Rentschler, 2023, "Frictional contact mechanics of asymmetric soft textures", *Tribology International*, **183**, 108416.
15. A. Darabi, R. Long, J.C. Weber, L.M. Cox, 2023, "Effect of geometry and orientation on the tensile properties and failure mechanisms of compliant suture joints, *ACS Applied Materials and Interfaces*, **15**, 11084-11091.
16. M. Afshar-Mohajer, X. Yang, R. Long, M. Zou, 2023, "3D printing of micro/nano-hierarchical

structures with various structural stiffness for controlling friction and deformation", *Additive Manufacturing*, **62**, 103368.

17. J. Martinez, S. Fan, S. Rabade, A.K. Blevins, K. Fung, J.P. Killgore, S.B. Perez, K. Youngbear, C. Carbrello, S. Foley, X. Ding, **R. Long**, R. Castro, Y. Ding, 2022, "Capillary infiltration kinetics in highly asymmetric porous membranes and the resulting debonding behaviors", *Polymer*, **263**, 125529.
18. Z. Lei, H. Chen, C. Luo, Y. Rong, Y. Hu, Y. Jin, **R. Long**, K. Yu, W. Zhang, 2022, "Recyclable and malleable thermosets enabled by activating dormant dynamic linkages", *Nature Chemistry*, **14**, 1399-1404.
19. K.N. Calahan#, Y. Qi#, (#: equal contribution), K.G. Johannes, M.E. Rentschler, **R. Long**, 2022, "Local lateral contact governs shear traction of micropatterned surfaces on hydrogel substrates", *Science Advances*, **8**, eabn2728.
20. Q. Guo, J. Caillard, D. Colombo, **R. Long**, 2022, "Dynamic effects in the fatigue fracture of viscoelastic solids", *Extreme Mechanics Letters,* **54**, 101726.
21. B. Hoyer, **R. Long**, M.E. Rentschler, 2022, "A tribometric device for rolling contact of soft elastomers", *Tribology Letters*, **70**, 39.
22. X. Sun, K. Wang, H.A. Wu, J. Chen, **R. Long**, 2022, "Finite element simulation of a viscoelastic cell entering a cylindrical channel: effects of frictional contact", *Mechanics of Materials,* **167**, 104263.
23. K.G. Johannes, K.N. Calahan, L. Bown, E. Zuetell, **R. Long**, M.E. Rentschler, 2022， "Mechanically switchable micro-patterned adhesive for soft material applications", *Extreme Mechanics Letters*, **52**, 101622.
24. C.Y. Hui, B. Zhu, **R. Long**, 2022, "Steady state crack propagation in viscoelastic solids: a comparative study", *Journal of the Mechanics and Physics of Solids,* **159**, 104748.
25. J. Martinez, M. Aghajani, Y. Lu, A.K. Blevins, S. Fan, M. Wang, J.P. Killgore, S.B. Perez, J. Patel, C. Carbrello, S. Foley, R. Sylvia, **R. Long**, R. Castro, Y. Ding, 2022, "Capillary bonding of membranes by viscous polymers: infiltration kinetics and mechanical integrity of the bonded polymer/membrane structures", *Journal of Membrane Science,* **641**, 119898.
26. M. Afshar-Mohajer, X. Yang, **R. Long**, M. Zou, 2022, "Understanding the friction and deformation behavior of micro/nano-hierarchical textures through in situ SEM observation and mechanics modeling", *Tribology International*, **165**, 107271.
27. C. Li, Z. Wang, Y. Wang, Q. He, **R. Long**, S. Cai, 2021, "Effect of network structure on the fracture of hydrogel", *Extreme Mechanics Letters*, **49**, 101495.
28. L. Yu#, Z. Lei# (#: equal contribution), X. Sun, P. Ding, A. Wesche, Y. Jin, W. Zhang, **R. Long**, 2021, "Rapid fabrication of fiber reinforced polyimine composites with reprocessability, repairabiliy and recyclability", *ACS Applied Polymer Materials*, **3**, 5808-5817.
29. X. Yang, L. Yu, **R. Long**, 2021, "Contact mechanics of inflated circular membrane under large deformation: analytical solutions", *International Journal of Solids and Structures*, **233**, 111222.
30. Y. Lu, Y. Qi, M. Tarnadi, **R. Long**, 2021, "Mixed-mode fracture in a soft elastomer", *Extreme Mechanics Letters*, **48**, 101380.
31. Z. Yang#, X. Yang# (#: equal contribution), **R. Long**, J. Li, 2021, "Stimulation modulates adhesion and

mechanics of hydrogel adhesives", *Langmuir,* **37**, 7097-7106.

32. L. Yu[#], X. Sun[#], (#: equal contribution), Y. Jin, W. Zhang, **R. Long**, 2021, "Mechanics of vitrimer particle compression and fusion under heat press", *International Journal of Mechanical Sciences*, **201**, 106466.
33. Y. Zhuo, Z. Xia, Y. Qi, T. Sumigawa, J. Wu, P. Šesták, Y. Lu, V. Håkonsen, T. Li, F. Wang, W. Chen, S. Xiao, **R. Long**, T. Kitamura, L. Li, J. He, Z. Zhang, 2021, "Simultaneously toughening and stiffening elastomers with octuple hydrogen bonding", *Advanced Materials*, **33**, 2008523.
34. Y. Chen, C.J. Yeh, Q. Guo, Y. Qi, **R. Long**, C. Creton, 2021, "Fast reversible isomerization of merocyanine as a tool to quantify stress history in elastomers", *Chemical Science,* **12**, 1693-1701.
35. **R. Long**, C.Y. Hui, J.P. Gong, E. Bouchbinder, 2021, "The fracture of highly deformable soft materials: a tale of two length scales", *Annual Review of Condensed Matter Physics*, **12**, 71-94.
36. M. Wang, S.K. Ghosh, C.M. Stafford, A.K. Blevins, S. Huang, J. Martinez, **R. Long**, C.N. Bowman, J.P. Killgore, M. Zou, Y. Ding, 2020, "Snakeskin-inspired elastomers with extremely low coefficient of friction under dry condition", *ACS Applied Materials and Interfaces*, **12**, 57450-57460.
37. L. Bowen[#], K. Johannes[#], (#: equal contribution), E. Zuetell, K. Calahan, S.A. Edmundowicz, **R. Long**, M.E. Rentschler, 2020, "Patterned enteroscopy balloon design factors influence tissue anchoring", *Journal of the Mechanical Behavior of Biomedical Materials,* **111**, 103966.
38. Q. Guo, **R. Long**, 2020, "Mechanics of polymer networks with dynamic bonds", In: C. Creton and O. Okay (eds) Self-Healing and Self-Recovering Hydrogels, *Advances in Polymer Science*, **285**, 127-164, Springer, Cham.
39. N. Sowan, Y. Lu, K. Kolb, L. Cox, **R. Long**, C.N. Bowman, 2020, "Enhancing the toughness of composites via dynamic thiol-thioester exchange (TTE) at the resin-filler interface", *Polymer Chemistry,* **11**, 4760-4767.
40. Z. Su, Y. Hu, X. Yang, **R. Long**, Y. Jin, X. Wang, W. Zhang, 2020, "Production and closed-loop recycling of biomass-based malleable materials", *Science China Materials*, **63**, 2071-2078.
41. Y. Chen, C.J. Yeh, Y. Qi, **R. Long**, C. Creton, 2020, "From force-responsive molecules to quantifying and mapping stresses in soft materials", *Science Advances*, **6**, eaaz5093.
42. Y. Qi, K.N. Calahan, M.E. Rentschler, **R. Long**, 2020, "Friction between a plane strain circular indenter and a thick poroelastic substrate", *Mechanics of Materials,* **142**, 103303.
43. S.R. Lavoie, **R. Long**, T. Tang, 2020, "Modeling the mechanics of polymer chains with deformable and active bonds", *Journal of Physical Chemistry B*, **124**, 253-265.
44. K. Wang, X. Sun, Y. Zhang, Y. Wei, D. Chen, H.A. Wu, Z. Song, **R. Long**, J. Wang, J. Chen, 2020, "Microfluidic cytometry for high-throughput characterization of single cell cytoplasmic viscosity using crossing constriction channels", *Cytometry Part A*, **97A**, 630-637.
45. L. Yu, C. Zhu, X. Sun, J.A. Salter, H.A. Wu, Y. Jin, W. Zhang, **R. Long**, 2019, "Rapid fabrication of malleable fiber reinforced composites with vitrimer powder", *ACS Applied Polymer Materials*, **1**, 2535-2542.
46. K.G. Johannes, K.N. Calahan, Y. Qi, **R. Long**, M.E. Rentschler, 2019, "Three-dimensional microscale imaging and measurement of soft material contact interfaces under quasi-static normal indentation

and shear", *Langmuir*, **35**, 10725-10733.

47. L. Cox, A. Blevins, J. Drisko, Y. Qi, Y. Ding, C. Higgins, **R. Long**, C. Bowman, J. Killgore, 2019, "Tunable mechanical anisotropy, crack guiding, and toughness enhancement in two-stage reactive polymer networks", *Advanced Engineering Materials*, **21**, 1900578.
48. Y. Lu, J.D. Carroll, K.N. Long, **R. Long**, 2019, "Failure of single glass micro balloons embedded in elastomer matrix under indentation", *Composites Part B: Engineering*, **173**, 106870.
49. K. Wang, X. Sun, Y. Zhang, T. Zhang, Y. Zheng, Y.C. Wei, P. Zhao, D.Y. Chen, H.A. Wu, W.H. Wang, **R. Long**, J.B. Wang, J. Chen, 2019, "Characterization of cytoplasmic viscosity of hundreds of single tumor cells based on micropipette aspiration", *Royal Society Open Science,* **6**, 181707.
50. S.R. Lavoie, P. Millereau, C. Creton, **R. Long**, T. Tang, 2019, "A continuum model for progressive damage in tough multi-network elastomers", *Journal of the Mechanics and Physics of Solids*, **125**, 523-549.
51. Y. Qi, Z. Zou, J. Xiao, **R. Long**, 2019, "Mapping the nonlinear crack tip deformation field in soft elastomer with a particle tracking method", *Journal of the Mechanics and Physics of Solids*, **125**, 326-346.
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55. Y. Qi, J. Caillard, **R. Long**, 2018, "Fracture toughness of soft materials with rate-independent hysteresis", *Journal of the Mechanics and Physics of Solids*, **118**, 341-364.
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PATENT

1. **R. Long**, W. Zhang, "Rapid Fabrication and/or Repair of Fiber Reinforced Covalent Adaptable Network Composites", Patent Application US17/634,922 and PCT/US2020/046486, filed August 14, 2020. Patent Pending.

CONTRIBUTED CONFERENCE PRESENTATIONS & ABSTRACTS (* Presenter)

1. G. Lostec, L. Corcoran*, H. Chen, W. Zhang, **R. Long**, Y. Jin, "Investigating the mechanical failure mechanisms of a novel CFRP composite to inform computational models", *Proceedings Volume 12950, Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, Civil Infrastructure, and Transportation XVIII*; Long Beach, CA, Mar. 25-28, 2024.
2. X. Yang*, **R. Long**, "Intrinsic fracture toughness of a viscoelastic pressure sensitive adhesive (PSA) film", *Adhesion Society Annual Conference*, Savannah, GA, Feb. 11-14, 2024.
3. S. Alzughaibi*, **R. Long**, "Experimental characterization of the fracture behavior of soft rubbers", *Gordon Research Conferences on Science of Adhesion*, South Hadley, MA, Jul. 23-28, 2023 (Poster).
4. H. Sethi*, S. Rabade, **R. Long**, M. Wald, J. Kemling, "Measuring the interface traction during peel test of adhesive tapes", *Gordon Research Conferences on Science of Adhesion*, South Hadley, MA, Jul. 23-28, 2023 (Poster).
5. S. Rabade*, **R. Long**, "Three-dimensional fracture effects in silicone elastomers", *Gordon Research Conferences on Science of Adhesion*, South Hadley, MA, Jul. 23-28, 2023 (Poster).
6. G. Lostec*, R. Long, "Fatigue fracture in linear viscoelastic solids", *Gordon Research Conferences on Science of Adhesion*, South Hadley, MA, Jul. 23-28, 2023 (Poster).
7. X. Yang*, L. Yu, **R. Long**, "Contact mechanics of inflated circular membrane under large deformation: analytical solutions", *Adhesion Society Annual Conference*, San Diego, CA, Feb.20-23, 2022.
8. S. Rabade*, R. Long, "Three-dimensional effects on the fracture of silicone elastomers", *Adhesion Society Annual Conference*, San Diego, CA, Feb.20-23, 2022.

9. S. Alzughaibi*, R. Long, 2021, "Peeling an elastic tape from a soft viscoelastic substrate: a finite element study", *Adhesion Society Annual Conference*, San Diego, CA, Feb.20-23, 2022.
10. X. Sun*, K. Wang, H.A. Wu, J. Chen, **R. Long**, "Finite element simulation of a cell entering a pipette: effects of large deformation and frictional contact", APS March Meeting, Denver CO (online conference), Mar.2-6, 2020.
11. K. Calahan*, Y. Qi, M.E. Rentschler, **R. Long**, "Mapping three-dimensional micromechanics between micro-pillars and soft gel substrates", *Society of Engineering Science Annual Meeting,* St. Louis, MO, Oct. 13-15, 2019 (Poster).
12. Y. Lu*, Y. Qi, M. Tenardi, **R. Long**, "Mixed-mode fracture in a soft elastomer", *Gordon Research Conferences on Adhesion Science*, South Hadley, MA, Jul. 21-26, 2019 (Poster).
13. X. Sun*, L. Yu*, H. Wu, **R. Long**, "Delamination mechanics of low-adhesion coatings with mechanical heterogeneities", *Gordon Research Conferences on Adhesion Science*, South Hadley, MA, Jul. 21-26, 2019 (Poster).
14. K.G. Johannes*, **R. Long**, M.E. Rentschler, "Multi-material micro-pillars: tunable contact properties of highly strained surfaces for next generation of medical devices", *Gordon Research Conferences on Adhesion Science*, South Hadley, MA, Jul. 21-26, 2019 (Poster).
15. K. Calahan*, Y. Qi, K.G. Johannes**, R. Long**, M.E. Rentschler, "Mapping three-dimensional micromechanics for investigation of soft tribology mechanisms", *Gordon Research Conferences on Adhesion Science*, South Hadley, MA, Jul. 21-26, 2019 (Poster).
16. Y. Qi, Z. Zou, J. Xiao, **R. Long***, "Mapping nonlinear crack tip deformation field in soft materials with a particle tracking method", *Society of Experimental Mechanics Conference*, Reno, NV, Jun.3-6, 2019.
17. Y. Qi*, Zhanan Zou, Jianliang Xiao, **R. Long**, "Mapping highly nonlinear deformation field in a soft material with a particle tracking method", *Adhesion Society Annual Conference*, Hilton Head, SC, Feb.17-20, 2019.
18. Y. Qi, Zhanan Zou, Jianliang Xiao, **R. Long***, "Mapping crack tip strain fields in soft polymers with a particle tracking method", *Gordon Research Conferences on Multifunctional Materials and Structures*, Ventura, CA, Jan. 14-19, 2018 (Poster).
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20. Y. Qi*, Zhanan Zou, Jianliang Xiao, **R. Long**, "Mapping crack tip strain fields in soft polymers with a particle tracking method", *3M Science and Engineering Faculty Day*, St Paul, MN, June 5-6, 2017 (Poster).
21. S.R. Lavoie*, **R. Long**, T. Tang, "A constitutive model for multinetwork elastomer: bridging molecular mechanics and macroscopic fracture", *Gordon Research Conferences on Adhesion Science*, South Hadley, MA, Jul. 23-28, 2017 (Poster).
22. **R. Long***, K. Mayumi, C. Creton, T. Narita, C.Y. Hui, "Time dependent mechanics of a dual-crosslink self-healing gel", *Society of Engineering Science Conference*, College Station, TX, Oct. 26-28, 2015.
23. T.H. Lengyel, P. Schiavone, **R. Long***, "Large deformation of an interface crack with finite slippage",

Gordon Research Conference on Adhesion Science, South Hadley, MA, Jul. 26-31, 2015 (Poster).

24. S. Lavoie*, **R. Long**, T. Tang, "Rate dependent fracture of polymers: beyond cohesive zone modeling", *Gordon Research Conference on Adhesion Science*, South Hadley, MA, Jul.26-31, 2015 (Poster).
25. **R. Long***, H.J. Qi, M.L. Dunn, "Modeling covalently adaptable polymer networks", *International Congress of the Canadian Society for Mechanical Engineering*, Toronto, ON, Canada, Jun. 1-4, 2014.
26. **R. Long***, M.L. Dunn, "Channel cracks in composite thin film coatings with alternating stiff and soft layers", *Adhesion Society Annual Conference*, San Diego, CA, Feb. 23-26, 2014.
27. R.C. Butz*, **R. Long**, T.M. Nelson, G.S.H. Lock, C.R. Dennison, "Towards a numerical tool for helmet impact liner design and simulation: approximating impact energy attenuation in a pore-fluid material using a viscoelastic material model", *14th Annual Alberta Biomedical Engineering Conference*, Oct. 25-27, 2013 (Poster).
28. M.S. Hall*, X. Feng, Y. Huang, **R. Long**, C.Y. Hui, M. Wu, "Single cell traction microscopy within 3D collagen matrices", *5th International Conference on Mechanics of Biomaterials and Tissues*, Sitges, Spain, Dec. 8-12, 2013.
29. M.L. Dunn*, H.J. Qi, **R. Long**, "Chemomechanics of covalently-adaptable polymer networks with temperature-dependent bond exchange reactions", *7th International Conference on Materials for Advanced Technologies*, Suntec, Singapore, Jun. 30 - Jul. 5, 2013.
30. M.L. Dunn*, N. Boddeti, X. Liu, S. Koenig, **R. Long**, J. Xiao, S. Bunch, "Influence of surface forces on graphene nanostructures", *7th International Conference on Materials for Advanced Technologies*, Suntec, Singapore, Jun. 30 - Jul. 5, 2013.
31. M.L. Dunn*, H.J. Qi, K.N. Long, **R. Long**, "Thermodynamics and mechanics of reacting network polymers with dynamic topology", *International Workshop on Computational Mechanics of Materials*, Baltimore, MD, Sep. 24-26, 2012.
32. M.S. Hall*, **R. Long**, B.J. Kim, C. Roh, C.Y. Hui, M. Wu, "Mapping single cell traction field within a three dimensional collagen matrix using a fluorescence microscope", *Spring MRS Meeting*, San Francisco, CA, Apr. 9-13, 2012.
33. E. Laprade*, **R. Long**, C.Y. Hui, K. R. Shull, "Membrane geometries for adhesive contact measurements: estimation of membrane tension", *Adhesion Society Annual Conference,* New Orleans, LA, Feb. 26-29, 2012.
34. **R. Long**, M.S. Hall, M. Wu, C.Y. Hui*, "Measuring gel modulus using a micro-indenter: effect of gel thickness and large deformation", *Adhesion Society Annual Conference,* New Orleans, LA, Feb. 26-29, 2012.
35. M.S. Hall*, **R. Long**, C. Roh, C.Y. Hui, M. Wu, "Mapping 3D cellular traction in real time using a fluorescence microscope", *BMES Annual Meeting*, Hartford, CT, Oct. 12-15, 2011 (Poster).
36. M.S. Hall*, **R. Long***, C. Roh, C.Y. Hui, M. Wu, "Mapping 3D stress and strain fields within a soft hydrogel using a fluorescence microscope", *Gordon Research Conference on Adhesion Science*, Lewiston, ME, Jul. 24-29, 2011 (Poster).
37. **R. Long***, M.S. Hall, M. Wu, C.Y. Hui, "Measuring soft gel modulus using a microscope", *3rd BEE Research Symposium, Cornell University*, Ithaca, NY, Mar. 4, 2011, (Poster).

38. **R. Long***, S. Manohar, A. Jagota, C.Y. Hui, M. Bykhovskaia, "Mechanics of fusion of a vesicle to a plasma membrane", *16th US National Congress of Theoretical and Applied Mechanics*, State College PA, Jun. 27-Jul. 2, 2010.
39. **R. Long***, C.Y. Hui, A. Jagota, K.J. Wahl, R. Everett, "Barnacles stick to surfaces by crack trapping", *Adhesion Society Annual Conference*, Daytona Beach FL, Feb. 21-24, 2010.
40. **R. Long***, C.Y. Hui, K. Shull, "Large deformation adhesive contact mechanics of inflated membranes", *Adhesion Society Annual Conference*, Daytona Beach FL, Feb. 21-24, 2010.
41. **R. Long***, C.Y. Hui, "Effect of triaxiality on crack-like cavity growth in soft materials", *Adhesion Society Annual Conference*, Daytona Beach FL, Feb. 21-24, 2010.
42. **R. Long*** and C.Y. Hui, "Effects of triaxiality on the growth of crack-like cavities in soft incompressible elastic solids", *Gordon Research Conference on Adhesion Science*, New London NH, Jul. 26-31, 2009, (Poster).

INVITED TALKS

1. "Viscoelastic fracture mechanics: steady-state crack growth and beyond", *AmeriMech Symposium on the Fracture of Soft Materials*, Austin, Texas, May 12-16, 2024
2. "Measuring deformation in soft materials by particle tracking", Department of Mechanical and Aerospace Engineering, *Syracuse University*, March 29, 2024.
3. "Mapping soft material deformation by tracking tracer particles", Department of Mechanical Engineering, *McGill University*, November 22, 2023.
4. "Mapping soft material deformation by tracking tracer particles", Institutive of Applied Mathematics and Department of Mechanical Engineering, *University of British Columbia*, March 27, 2023.
5. "Fracture of viscoelastic solids: steady state crack growth and beyond" (virtual presentation), invited speaker, *2022 Boulder Workshop on Soft & Active Matter Mechanics*, April 28-29, 2022.
6. "Mapping deformation and dissipation during fracture of soft viscoelastic hydrogel" (virtual presentation), invited speaker, *the 18th International Conference on Deformation, Yield and Fracture of Polymers,* Kerkrade, Netherlands, Apr. 11-13, 2022.
7. "Mapping large deformation field in soft materials with a particle tracking method", *Colorado State University*, March 24, 2022.
8. "Mapping large deformation field in soft materials with a particle tracking method", *Rocky Mountain Mechanics Seminar Series, University of Colorado Boulder*, January 24, 2022.
9. "Experimental characterization of crack propagation in soft materials with a particle tracking method" (virtual presentation), *IUTAM Symposium on the Mechanics of Smart and Tough Gels*, May 25, 2021.
10. "Mapping large deformation field in soft materials with a particle tracking method" (virtual presentation), Department of Mechanical and Aerospace Engineering, *University of California at San Diego*, May 17, 2021.
11. "Mapping nonlinear deformation fields in soft materials with a particle tracking method", Sibley School of Mechanical and Aerospace Engineering, *Cornell University*, Oct. 22, 2019.
12. "Viscoelasticity of gels with dynamic bonds: molecular kinetics and macroscopic mechanics", invited speaker, *APS March Meeting*, Boston, MA, Mar.4-8, 2019.
13. "Hysteresis and fracture in soft dissipative materials", invited speaker, *the 18th U.S. National Congress on Theoretical and Applied Mechanics*, Chicago, IL, Jun. 5-9, 2018.

14. “Hysteresis and fracture in soft materials”, *Michelin Research Center*, Ladoux, France, May 31, 2018.
15. “Hysteresis and fracture in soft materials”, *ESPCI Paris*, France, May 15, 2018.
16. “Hysteresis and fracture in soft materials”, *National Institute of Standards and Technology*, Apr. 11, 2018.
17. “Fracture mechanics of soft materials”, Department of Mechanical Engineering, *Colorado School of Mines*, Nov. 30, 2017.
18. “Hysteresis and fracture in soft materials”, *Gordon Research Conferences on Adhesion Science*, South Hadley, MA, Jul. 24, 2017.
19. “Fracture mechanics of soft dissipative materials”, Department of Modern Mechanics, *University of Science and Technology of China*, May 18, 2017.
20. “Fracture mechanics of soft dissipative materials”, Department of Mechanical Engineering, *University of California at Santa Barbara*, May 15, 2017.
21. “Mechanics of adhesion for soft materials under large deformation”, *3M Research Center*, Nov. 1, 2016.
22. “Time-dependent mechanics of polymers with dynamic bonds”, Department of Mechanical Engineering, *University of Nevada at Reno*, Aug. 26, 2016.
23. “Mapping three-dimensional deformation field in transparent soft materials: applications to fracture”, *ESPCI Paris Tech*, France, Jul. 1, 2016.
24. “Mapping three-dimensional deformation field in transparent soft materials: applications to fracture”, *Michelin Research Center*, Ladoux, France, Jun. 29, 2016.
25. “Time-dependent mechanics of polymers with dynamic bonds”, invited speaker, the 3M award .
26. “Mechanics of polymeric materials with dynamic bonds”, invited speaker, the 16th *International Conference on Deformation, Yield and Fracture of Polymers,* Kerkrade, Netherlands, Mar.29-Apr. 2, 2015.
27. “Time dependent mechanics of soft polymers with dynamic bonds”, Department of Mechanical Engineering, MCEN5027 Seminar Series, University of Colorado at Boulder, Oct. 23, 2014.
28. “Mapping strain and stress fields in soft materials”, Department of Modern Mechanics, *University of Science and Technology of China*, Jul. 9, 2013.
29. “Measurement of three-dimensional cell tractions”. State Key Laboratory of Transducer Technology, *Institute of Electronics*, *Chinese Academy of Sciences*, Jul. 4, 2013.
30. “Thermodynamics and mechanics of polymer networks with adaptable dynamic bonds”, Department of Mechanical Engineering, *University of Alberta*, Jan. 24, 2013.
31. “Mapping strain and stress fields in soft gels”, Department of Mechanical Engineering, MCEN 5027 Seminar Series, *University of Colorado at Boulder*, Apr. 12, 2012.
32. “Mechanics of fusion of a vesicle to a plasma membrane”, Solid Mechanics Seminar, Sibley School of Mechanical and Aerospace Engineering, *Cornell University*, Oct. 6, 2010.

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