Carson J. Bruns
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ATLAS Institute / Paul M. Rady Dept. of Mechanical Engineering
University of Colorado Boulder
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EDUCATION

- Doctor of Philosophy — *Northwestern University* — December 2013
  Organic Chemistry — Advisors: J. Fraser Stoddart, Samuel I. Stupp
- Bachelor of Arts *magna cum laude* — *Luther College* — May 2008
  Majors: Chemistry, Religion | Minor: Mathematics

PROFESSIONAL EXPERIENCE

Co-Founder & Chief Science Officer	*HYPRSKN Inc.*	2022–Present
Assistant Professor	*University of Colorado Boulder*	2017–Present
Co-Founder & President	*CHROMAPRAXIS LLC*	2020–2021
Miller Research Fellow (w/ Matthew B. Francis)	*University of California Berkeley*	2014–2017

AWARDS / HONORS

Outstanding Faculty Mentor Award	*University of Colorado Boulder*	2022
Miller Research Fellowship	*Miller Institute, UC Berkeley*	2014–2017
Springer ISMSC2015 Poster Prize	*International Symposium on Macrocyclic & Supramolecular Chemistry*	2015
NSF East Asia and Pacific Summer Institutes JSPS Summer Program Fellow	*University of Tokyo*	Summer 2013
NSF Graduate Research Fellowship	*National Science Foundation*	2010–2013
World Class University Project Visiting Scholar	*Korea Advanced Institute of Science and Technology (KAIST)*	Fall 2011
Global Center of Excellence Visiting Scholar	*University of Tokyo*	Spring 2010
Springer ISMSC2010 Poster Prize	*International Symposium on Macrocyclic & Supramolecular Chemistry*	2010
Graduate Assistance in Areas of National Need	*U.S. Department of Education*	2008–2009
John G. and Mildred Breiland Fellowship	*Luther College Dept. of Chemistry*	2007–2008
NSF Research Experience for Undergraduates	*Chulabhorn Research Institute*	Summer 2007
NSF Research Experience for Undergraduates	*Coe College*	Summer 2006
Regents Scholarship	*Luther College*	2004–2008

PUBLICATIONS

Underlined: Bruns advisees | ⁼equal authors | *corresponding authors

Books

CJ Bruns,* JF Stoddart,* *The Nature of the Mechanical Bond: From Molecules to Machines*. Hoboken: John Wiley & Sons, 2016. 761 pages. ISBN: 9781119044000. doi.org/10.1002/9781119044123

Peer-Reviewed Publications

Google Scholar Page: 3620 Citations, *h*-index 26, *i*10 index 34

Work at CU Boulder:

49. M Atreya, S DeSousa, J-B Kauzya, E Williams, K Dikshit, A Hayes, J Nielson, A Palmgren, S Khorchidian, S Liu, A Gopalakrishanan, E Bihar, **CJ Bruns**, R Bardgett, JN Quinton, J Davies, JC Neff, GL Whiting*. A Transient Printed Soil Decomposition Sensor based on a Biopolymer Composite Conductor. *ACS Appl. Electron. Mater.* **2022**, *In Press* doi.org/10.1002/advs.202205785

48. CJ Bruns.* Moving Forward in the Semantic Soup of Artificial Molecular Machine Taxonomy. *Nature Nanotechnol.* **2022**, *In Press*. doi.org/10.1038/s41565-022-01247-5

47. M Atreya, G Marinick, C Baumbauer, KV Dikshit, S Liu, C Bellerjeau, J Nielson, S Khorchidian, A Palmgren, Y Sui, R Bardgett, D Baumbauer, **CJ Bruns**, JC Neff, AC Arias, GL Whiting*. Wax Blends as Tunable Encapsulants for Soil-Degradable Electronics. *ACS Appl. Electron. Mater.* **2022***, 4*, 4912–4920*.* doi.org/10.1021/acsaelm.2c00833

46. H Kwon, B Newell, **CJ Bruns***. Redox-Switchable Host-Guest Complexes of Metallocenes and [8]Cycloparaphenylene. *Nanoscale* **2022**, *14*, 14276–14285. doi.org/10.1039/d2nr03852h

45. Y Sui, AN Radwan, A Gopalakrishnan, K Dikshit, **CJ Bruns**, CA Zorman, GL Whiting*. A Reactive Inkjet Printing Process for Fabricating Biodegradable Conductive Zinc Structures. *Adv. Eng. Mater.* **2022***, In Press.* doi.org/10.1002/adem.202200529

44. KV Dikshit, **CJ Bruns***. Slide-Ring Materials Based on Self-Assembled Polyrotaxane "Molecular Necklaces". In *Supramolecular Nanotechnology. Advanced Design of Self-Assembled Functional Materials.* M Conda-Sheridan, O Azzaroni (Eds.) Weinheim: Wiley-VCH GmbH, 2022. *In Press.*

43. KV Dikshit, **CJ Bruns***. Chemorheological Monitoring of Cross-Linking in Slide-Ring Gels Derived from α-Cyclodextrin Polyrotaxanes. *Front. Chem.* **2022**, *10*:923775. doi.org/10.3389/fchem.2022.923775

42. JL Butterfield, GP Penoncello, KV Dikshit, **CJ Bruns**.* A Photochromic Intradermal Smart Tattoo Based on Diarylethene-Doped Polystyrene Nanoparticles for Personal γ-Ray Dosimetry. *ACS Applied Nano Materials* **2022**, *5*, 13840–13844*.* doi.org/10.1021/acsanm.2c01554

41. H Kwon, **CJ Bruns**.* All-Conjugated Cycloparaphenylene-Polycyclic Aromatic Hydrocarbon Host-Guest Complexes Stabilized by CH–π Interactions. *Nano Research* **2022***, 15*, 5545–5555. doi.org/10.1007/s12274-022-4145-5

40. X Zhou, H Kwon, RR Thompson, R Herman, FR Fronczek, **CJ Bruns**, S Lee.* Scalable Synthesis of [8]Cycloparaphenyleneacetylene via Alkyne Metathesis and Bromination/ Dehydro-bromination. *Chem. Commun.* **2021**, *57*, 10887–10890. doi.org/10.1039/D1CC04776K

39. Purnendu, S Novack, E Acome, M Alistar, C Keplinger, MD Gross, **C Bruns**,* D Leithinger.* Electriflow: Augmenting Books With Tangible Animation Using Soft Electrohydraulic Actuators *SIGGRAPH '21 Labs*, August 09-13, **2021**, Virtual, USA. doi.org/10.1145/3450616.3464523

38. Purnendu, S Novack, E Acome, C Keplinger, M Alistar, MD Gross, **C Bruns**,* D Leithinger.* Electriflow: Soft Electrohydraulic Building Blocks for Prototyping Shape-changing Interfaces, In *Designing Interactive Systems Conference 2021 (DIS '21), June 28-July 2,* **2021**, *Virtual Event.* ACM, New York, NY, USA, 10 pages. doi.org/10.1145/3461778.3462093

37. Purnendu, E Acome, C Keplinger, MD Gross, **C Bruns**,* D Leithinger.* Soft Electrohydraulic Actuators for Origami Inspired Shape-Changing Interfaces. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21 Extended Abstracts), May 8–13,* **2021***, Yokohama, Japan.* ACM, New York, NY, USA, 6 pages. doi.org/10.1145/3411763.3451590

36. KV Dikshit, **CJ Bruns**.* Post-Synthesis Modification of Slide-Ring Gels for Thermal and Mechanical Reconfiguration. *Soft Matter* **2021**, *17*, 5248–5257. doi.org/10.1039/D0SM02260H

35. A Parameswar, KV Dikshit, S Movafaghi, **CJ Bruns**, AP Goodwin.* Mechanochemistry Activated Covalent Conjugation Reactions in Soft Hydrogels Induced by Interfacial Failure. *ACS Appl. Mater. Interfaces* **2021**, *13*, 1486–1492. doi.org/10.1021/acsami.0c18432

34. JL Butterfield, SP Keyser, KV Dikshit, H Kwon, MI Koster, **CJ Bruns**.* Solar Freckles: Long-Term Photochromic Tattoos for Intradermal UV Radiometry. *ACS Nano* **2020**, *14*, 13619–13628. doi.org/10.1021/acsnano.0c05723

33. M Atreya, K Dikshit, G Marinick, J Nielson, **C Bruns,** GL Whiting.* Poly(lactic acid)-Based Ink for Biodegradable Printed Electronics With Conductivity Enhanced Through Solvent Aging. *ACS Appl. Mater. Interfaces* **2020**, *12*, 23494–23501. doi.org/10.1021/acsami.0c05196

32. **CJ Bruns**.* Exploring and Exploiting the Symmetry-Breaking Effect of Cyclodextrins in Mechanomolecules. *Symmetry* **2019**, *11*, 1249–1271. doi.org/10.3390/sym11101249

Prior to CU Boulder:

31. D Sluysmans, F Devaux, **CJ Bruns**, JF Stoddart, A-S Duwez.* Dynamic Force Spectroscopy of Synthetic Oligorotaxane Foldamers. *Proc. Natl. Acad. Sci. U.S.A*. **2018**, *115*, 9362–9366. doi.org/10.1073/pnas.1712790115

30. D Sluysmans, S Hubert, **CJ Bruns,** Z Zhu, JF Stoddart, A-S Duwez*. Synthetic Oligorotaxanes Exert High Forces When Folding Under Mechanical Load. *Nat. Nanotech.* **2018**, *13*, 209–213. doi.org/10.1038/s41565-017-0033-7

29. S Loser, SJ Lou, BM Savoie, **CJ Bruns**, A Timalsina, MJ Leonardi, T Harschneck, R Turrisi, N Zhou, CL Stern, AA Sarjeant, A Facchetti,* RPH Chang,* SI Stupp,* MA Ratner,* LX Chen,* TJ Marks.* Systematic Evaluation of Structure-Property Relationships in Heteroacene-Diketopyrrolo-

pyrrole Molecular Donors for Organic Solar Cells. *J. Mater. Chem. A* **2017***, 5*, 9217–9232. doi.org/10.1039/C7TA02037F

28. CC Slack, JA Finbloom, K Jeong, **CJ Bruns**, DE Wemmer, A Pines, MB Francis.* Rotaxane Probes for Protease Detection by ^{129}Xe HyperCEST NMR. *Chem. Commun*. **2017**, *53*, 1076–1079. doi.org/10.1039/C6CC09302G

27. JA Finbloom, CC Slack, **CJ Bruns**, K Jeong, DE Wemmer, A Pines, MB Francis.* Rotaxane-Mediated Suppression and Activation of Cucurbit[6]uril for Molecular Detection by ^{129}Xe HyperCEST NMR. *Chem. Commun.* **2016**, *52*, 3119–3122. doi.org/10.1039/C5CC10410F

26. **CJ Bruns**, H Liu, MB Francis.* Near-Quantitative Aqueous Synthesis of Rotaxanes via Bioconjugation to Oligopeptides and Proteins. *J. Am. Chem. Soc.* **2016**, *138*, 15307–15310. doi.org/10.1021/jacs.6b10231

25. T Aytun, PJ Santos, **CJ Bruns**, D Huang, AR Koltonow, M Olvera de la Cruz, SI Stupp.* Self-Assembling Tripodal Small-Molecule Donors for Bulk Heterojunction Solar Cells. *J. Phys. Chem. C* **2016**, *120*, 3602–3611. doi.org/10.1021/acs.jpcc.5b10064

24. X Hou,[=] C Ke,[=] **CJ Bruns**, PR McGonigal, RB Pettman, JF Stoddart.* Tunable Solid-State Fluorescent Materials for Supramolecular Encryption. *Nat. Commun.* **2015**, *6,* 6884. doi.org/10.1038/ncomms7884

23. **CJ Bruns**,[=] D Fujita,[=] M Hoshino, S Sato, JF Stoddart,* M Fujita.* Emergent Ion-Gated Binding of Cationic Host-Guest Complexes Within Cationic $M_{12}L_{24}$ Molecular Flasks. *J. Am. Chem. Soc.* **2014**, *136*, 12027–12034. doi.org/10.1021/ja505296e

22. **CJ Bruns**, JF Stoddart.* Rotaxane-Based Molecular Muscles. *Acc. Chem. Res.* **2014**, *47*, 2186–2199. doi.org/10.1021/ar500138u

21. **CJ Bruns**, M Frasconi, J Iehl, KJ Hartlieb, ST Schneebeli, C Cheng, SI Stupp,* JF Stoddart.* Redox Switchable Daisy Chain Rotaxanes Driven by Radical-Radical Interactions. *J. Am. Chem. Soc.* **2014**, *136*, 4714–4723. doi.org/10.1021/ja500675y ***Featured in JACS Spotlights***

20. **CJ Bruns**, J Li, M Frasconi, ST Schneebeli, J Iehl, H-P Jacquot de Rouville, SI Stupp, GA Voth,* JF Stoddart.* An Electrochemically and Thermally Switchable Donor-Acceptor [*c*2]Daisy Chain Rotaxane. *Angew. Chem., Int. Ed.* **2014**, *53*, 1953–1958. doi.org/10.1002/anie.201308498

19. **CJ Bruns**, JF Stoddart.* Mechanically Interlaced and Interlocked Donor-Acceptor Foldamers. *Adv. Polym. Sci.* **2013**, *261*, 271–294. doi.org/10.1007/12_2013_245

18. AC Fahrenbach, **CJ Bruns**, H Li, A Trabolsi, A Coskun, JF Stoddart.* Ground-State Kinetics of Bistable Redox-Active Donor-Acceptor Mechanically Interlocked Molecules. *Acc. Chem. Res.* **2014**, *47*, 482–493. doi.org/10.1021/ar400161z

17. **CJ Bruns**,[=] DJ Herman,[=] JB Minuzzo, JA Lehrman, SI Stupp.* Rationalizing Molecular Design in Electrodeposition of Anisotropic Lamellar Nanostructures. *Chem. Mater.* **2013**, *25*, 4330–4339. doi.org/10.1021/cm402505p

16. A Ruiz-Carretero, T Aytun, **CJ Bruns**, CJ Newcomb, W-W Tsai, SI Stupp.* Stepwise Self-Assembly to Improve Solar Cell Morphology. *J. Mat. Chem. A* **2013**, *1*, 11674–11681. doi.org/10.1039/C3TA12411H

15. A Guerrero, SC Loser, G Garcia-Belmonte, **CJ Bruns**, J Smith, H Miyauchi, SI Stupp, J Bisquert,* TJ Marks.* Solution-Processed Small Molecule:Fullerene Bulk-Heterojunction Solar Cells: Impedance Spectroscopy Deduced Bulk and Interfacial Limits to Fill-Factor. *Phys. Chem. Chem. Phys.* **2013**, *15*, 16456–16462. doi.org/10.1039/C3CP52363B

14. M Juričeк,[=] JC Barnes,[=] EJ Dale, W-G Liu, NL Strutt, **CJ Bruns**, NA Vermeulen, K Ghooray, AA Sarjeant, CL Stern, YY Botros, WA Goddard III,* JF Stoddart.* Ex^{2}Box: Interdependent Modes of Binding in a Two-Nanometer-Long Synthetic Receptor. *J. Am. Chem. Soc.* **2013**, *135*, 12736–12746. doi.org/10.1021/ja4052763

13. **CJ Bruns**, JF Stoddart.* Molecular Machines Muscle Up. *Nat. Nanotech.* **2013**, *8*, 9–10. doi.org/10.1038/nnano.2012.239

12. Z Zhu, **CJ Bruns**, H Li, J Lei, C Ke, Z Liu, S Shafaie, HM Colquhoun, JF Stoddart.* Synthesis and Solution-State Dynamics of Donor-Acceptor Oligorotaxane Foldamers. *Chem. Sci.* **2013**, *4*, 1470–1483. doi.org/10.1039/C3SC00015J

11. JC Barnes,[=] M Juričeк,[=] NL Strutt, M Frasconi, S Sampath, MA Giesener, PL McGrier, **CJ Bruns**, CL Stern, AA Sarjeant, JF Stoddart.* ExBox: A Polycyclic Aromatic Hydrocarbon Scavenger. *J. Am. Chem. Soc.* **2013**, *135*, 183–192. doi.org/10.1021/ja307360n

10. **CJ Bruns**, JF Stoddart.* The Mechanical Bond: A Work of Art. *Top. Curr. Chem.* **2012**, *323*, 19–72. doi.org/10.1007/128_2011_296
9. CM Gothard,[=] **CJ Bruns,**[=] NA Gothard, BA Grzybowski, JF Stoddart.* Modular Synthesis of Bipyridinium Oligomers and Corresponding Donor-Acceptor Oligorotaxanes with Crown Ethers. *Org. Lett.* **2012**, *14*, 5066–5069. doi.org/10.1021/ol302301r
8. H-P Jacquot de Rouville, J Iehl, **CJ Bruns**, PL McGrier, M Frasconi, AA Sarjeant, JF Stoddart.* A Neutral Naphthalene Diimide [2]Rotaxane. *Org. Lett.* **2012**, *14*, 5188–5191. doi.org/10.1021/ol3022963
7. AN Basuray, H-P Jacquot de Rouville, KJ Hartlieb, T Kikuchi, NL Strutt, **CJ Bruns**, MW Ambrogio, A-J Avestro, ST Schneebeli, AC Fahrenbach, JF Stoddart.* The Chameleonic Nature of Diazopyrenium Recognition Processes. *Angew. Chem., Int. Ed.* **2012**, *51*, 11872–11879. doi.org/10.1002/anie.201205089
6. AC Fahrenbach, KJ Hartlieb, C-H Sue, **CJ Bruns,** G Barin, S Basu, MA Olson, YY Botros, A Bagabas, N Khdary, JF Stoddart.* Rapid Thermally Assisted Donor-Acceptor Catenation. *Chem. Commun.* **2012**, 48, 9141–9143. doi.org/10.1039/C2CC34427K
5. AC Fahrenbach, **CJ Bruns**, D Cao, JF Stoddart.* Ground-State Thermodynamics of Redox-Active Donor-Acceptor Mechanically Interlocked Molecules. *Acc. Chem. Res.* **2012**, *45*, 1581–1592. doi.org/10.1021/ar3000629
4. S Loser, **CJ Bruns**, H Miyauchi, R Ponce Ortiz, A Facchetti,* SI Stupp,* TJ Marks.* A Naphthodithiophene-Diketopyrrolopyrrole Donor Molecule for Efficient Solution-Processed Solar Cells. *J. Am. Chem. Soc.* **2011**, *133,* 8142–8145. doi.org/10.1021/ja202791n
3. **CJ Bruns**, S Basu, JF Stoddart.* Improved Synthesis of 1,5-Dinaphtho[38]Crown-10. *Tetrahedron Lett.* **2010**, *51*, 983–986. doi.org/10.1016/j.tetlet.2009.12.060
2. RS Forgan, DC Friedman, CL Stern, **CJ Bruns**, JF Stoddart.* Directed Self-Assembly of a Ring-in-Ring Complex. *Chem. Commun.* **2010**, 5861–5863. doi.org/10.1039/C0CC00776E ***Front Cover***
1. S Boonya-Udtayan, N Yotapan, C Woo, **CJ Bruns**, S Ruchirawat, N Thasana.* Synthesis and Biological Activities of Azalamellarins. *Chem. Asian J.* **2010**, *5*, 2113–2123. doi.org/10.1002/asia.201000237

Non-Peer-Reviewed Publications

4. **CJ Bruns**, W Wang, K Hirose. Editorial: Recent Advances in Mechanically Bonded Molecules. *Front. Chem.* **2022**, *10*:1095082. doi.org/10.3389/fchem.2022.1095082
3. **CJ Bruns.** Dynamic tattoos promise to warn wearers of health threats. *The Conversation,* **2020**. https://theconversation.com/dynamic-tattoos-promise-to-warn-wearers-of-health-threats-133040
2. Drahl, C. A Conversation with Carson Bruns. *ACS Cent. Sci.* **2019**, *5*, 201–202. (Also appeared in *Chemical and Engineering News*, Volume 97, Issue 11.) cenm.ag/bruns
1. **CJ Bruns**. The Rise of Smart Tattoos. *TED^{x}MileHigh*, **2019**. https://www.tedxmilehigh.com/rise-smart-tattoos/

Patents Pending

3. K Shara, A Plum, M Graybill, **CJ Bruns**. Systems and Methods for Transferring Free Flowing Materials and Facilitating the Reaction Thereof. *PCT Application PCT/US22/78474.* Filed 20 October 2022.
2. JL Butterfield, **CJ Bruns**. Ultraviolet-Absorptive Nanoparticles and Microparticles for Intradermal Use. *PCT Application PCT/US21/47941.* Filed 27 August 2021.
1. JL Butterfield, **CJ Bruns**. Multistable Photochromic Pigments for Intradermal Use in Re-Writable Tattoos and Intradermal Ultraviolet Dosimetry. *PCT Patent Application No. PCT/US2022/022802* Filed 31 March 2022.

RESEARCH FUNDING & GIFTS	**Value**	**Role**	**Portion**	**Dates**
• *Collaborative Research: FW-HTF-R: RoboChemistry: Human-Robot Collaboration for the Future of Organic Synthesis* NSF #2222952	$1,820,478	PI	33%	9/1/22-8/31/25
• *Efficient, Scalable, Compostable Thin-Film BioPolymer Nanogenerators.* Facebook Research Award (PI: K. Jayaram)	$149,259	Co-PI	50%	1/1/22-6/30/23

• *Single-Particle Mechanics for Biocompatibility Studies of Anti-Photocarcinogenic Tattoos*. CU COSINC-CHR Material Characterization Project Award	$4,000	PI	100%	7/1/21-12/31/21
• *Self-Assembly of Shape-Defined Micro-Hydrogels: Top-Down Meets Bottom-Up*. NSF #2106158	$457,946	PI	100%	7/1/21-6/30/24
• *"Invisible Melanin": Permanent Transparent Tattoos that Reduce Skin Cancer and Aging Rates*. Colorado OEDIT Advanced Industries Proof of Concept Award	$189,441 (25% CU cost share)	PI	100%	11/19/20-11/18/22
• *Transient Mechanics of Active Slide-Ring Networks: From Molecular Motors to Molecular Machine*. NSF #2023179 (PI: F. Vernerey)	$477,044	Co-PI	50%	1/1/21-12/31/23
• *Microscopic Intradermal Implants for Biomedical Tattoos*. CU UROP Faculty Team Grant	$3,000	PI	100%	AY 20/21
• *Colloidal Rotaxanes: Polymer Particles with Mechanical Bonds*. ACS PRF #59067-DNI7	$110,000	PI	100%	9/1/18-8/31/20
• *Robotic Chemists: Automating the Synthesis of Multifunctional Materials*. CU MFM / ASIRT Seed Grants (PI: D. Szafir)	$30,000	Co-PI	50%	Spring 2018
• *A Chemistry Automation Robot*, VEX Robotics - Supplies Gift	$16,000	PI	100%	2020-23

RESEARCH MENTORING

Postdocs	**Dates Mentored**	**Current Position**
Hyejin Kwon	June 2018–December 2021	Senior Scientist, HYPRSKN
PhD Students	**Dates Mentored**	**Current Position**
Aseem Visal	August 2021–present	PhD Student, CU
Purnendu	September 2018–present	PhD Student, CU
Kailey Shara	June 2018–present	PhD Student, CU
Karan Dikshit	January 2018–August 2022	Senior R&D Engineer, TE Connectivity
Jesse Butterfield	September 2017–May 2022	Chief Technology Officer, HYPRSKN
MS Students	**Dates Mentored**	**Current Position**
Jackson Pope	Spring 2021	PhD Student, CU
Ninad Mehta	Fall 2019–Spring 2020	FEA Engineer, Caterpillar, Inc.
Sean Keyser	May–December 2019	PhD Student, CU
Undergraduate Students	**Dates Mentored**	**Current Position**
Neely Quirk	September 2022–present	Undergraduate Student, CU
Julie Clarke	October 2021–May 2022	Undergraduate Student, CU
Femke Janssen	August 2021–present	Undergraduate Student, CU
Teis Hart	August 2021–May 2022	Undergraduate Student, CU
Ferin von Reich	January 2021–present	Undergraduate Student, CU
Jaime Wickersheim	Summer 2021	Undergraduate Student, CU
Elderied McKinney	Summer 2021	Mobile Engineer, Rural Sourcing
Matthew Kim	Spring 2021–present	Undergraduate Student, CU
Jennifer Quigley	Fall 2020–Summer 2021	Research Intern, NREL
Justin Hall	Summer 2020–Spring 2021	Undergraduate Student, CU
Rita Kamenetskiy	Spring–Summer 2020	Undergraduate Student, CU
Xuedan Filmore	Spring 2020	Undergraduate Student, CU
Emily Powis	Summer 2019	Presidential Scholar, USC
Ian Stokes	Summer 2019	Mechanical Engineer, Life Fitness
Kiley Hartigan	April 2019–May 2020	Ski Patrol, Breckenridge
Nicole Leon-Molina	Spring 2019	Undergraduate Student, CU
Aya Ishikawa	March 2019–May 2020	Associate Scientist, Pfizer
Sarah Sadeq	September–December 2018	Undergraduate Student, CU
Phillip Vo	January–December 2018	Web Marketing Coordinator, CU
Hanwei Liu	March 2015–June 2016	PhD Candidate, Caltech
Peter J. Santos	December 2012–May 2014	Senior Scientist, actnano, Inc.

TEACHING

Courses Developed	Course Number		Semester
Color	ATLS-4519/5519		Fall 2017
Courses Taught	**Course Number**	**Enrollment**	**Semester**
Color	ATLS-4141	18	Fall 2022
Chemistry for Materials and Energy Science	MCEN-1024-001	42	Fall 2022
Color	ATLS-4141	31	Spring 2022
Research Career Development (co-taught)	ATLS-5519-006	11	Spring 2022
Color	ATLS-4519/5519	14	Fall 2020
Chemistry for Materials and Energy Science	MCEN-1024-003	47	Fall 2020
Color	ATLS-4519/5519	10	Fall 2019
Chemistry for Materials and Energy Science	MCEN-1024-110	54	Fall 2019
Chemistry for Materials and Energy Science	MCEN-1024-120	66	Fall 2019
Color	ATLS-4519/5519	22	Fall 2018
Chemistry for Materials and Energy Science	MCEN-1020	43	Spring 2018
Color	ATLS-4519/5519	11	Fall 2017
Independent Study Students	**Course Number**		**Semester**
Aseem Visal			Fall 2021
Ferin von Reich	ATLS-4900-906		Spring 2021
Jackson Pope	MCEN-6848-900		Spring 2021
Justin Hall	MCEN-4848-924		Fall 2020
Sophie Adams	ATLS-4900-901		Spring 2020
Kailey Shara	ATLS-7900-904		Spring 2020
Aya Ishikawa	MCEN-4848-905		Spring 2019
Kailey Shara	ATLS-5900-901		Summer 2018
Phillip Vo	MCEN-4848-905		Spring 2018

INVITED TALKS

32. Cobots in the Chemical R&D Lab — 5 December 2022
HUMAIN Future Lab Virtual Keynote, Ruhr-Universität Bochum

31. HYPRSKN: The Future of Skin — 19 May 2022
CatalyzeCU Guest Speaker Series

30. Finding Applications for Molecular Machines: Smart Adhesives to Smart Tattoos — 13 May 2022
Northwestern University Undergraduate Chemistry Council Colloquium

29. Tuning the unusual stress dissipation & actuation properties of slide-ring networks — 28 April 2022
2022 Boulder Workshop on Soft & Active Matter Mechanics

28. Unleashing the Power of Nanomachines — 12 April 2022
Paul M. Rady Dept. of Mechanical Engineering Strategic Advisory Board Meeting

27. Tattoos for Human Health: The Future of Smart Tattoos — 7 April 2022
Swedish American Historical Museum (Virtual)

26. Smart Tattoos — 31 March 2022
Teen Café, Lafayette Public Library

25. Biomedical Smart Tattoos — 8 November 2021
6th USERN Conference, Istanbul, Turkey

24. Unleashing the Power of Molecular Nanomachines — 15 October 2021
ATLAS Institute Annual Board of Directors Meeting

23. Tattoo Ink: Past, Present, Future — 30 September 2021
Susquehanna University Honors Colloquium, Selinsgrove, PA

22. Biomedical Applications of Tattoos — 16 June 2021
125th Annual Association of Food and Drug Officials Education Conference

21. Molecular Nanoengineering of Functional Materials — 4 February 2021
Brigham Young University Cheminar

20. Self-Assembling and Interlocking Polycyclic Aromatic Hydrocarbons. 22 October 2020
ChemPhysChem 2nd Virtual Seminar

19. Biomedical Tattoos for Human Health. 15 April 2020
University of Zurich Department of Chemistry Seminar

18. Smart Tattoos (https://youtu.be/wULG5olhbLA) 27 February 2020
CU Boulder NEXT Bufftalk, New York, NY, USA

17. Tattoos for Health: The Future of Smart Tattoos 24 November 2019
Vesterheim Museum Fall Lecture Series, Luther College, Decorah, IA

16. Biomedical Tattoos for Human Health 17 October 2019
CU Anschutz School of Pharmacy Graduate Seminar

15. The Future of Tattoos 28 September 2019
Colorado Tattoo Convention & Expo, Denver, CO

14. Cultivating Creativity 27 September 2019
ACTIVE Faculty Development and Leadership Program, CU Boulder

13. Chameleon Tattoos 25 September 2019
Teen Science Café, Belmar Library, Lakewood, CO

12. Creativity in Biomedical Research 15 September 2019
Boettcher Biomedical Summit, Denver, CO

11. Beyond Wellness Wearables: Get Ready for Smart Tattoos 12 September 2019
me Convention by SXSW / Mercedes-Benz, Frankfurt, Germany

10. Can a Tattoo Help You Stay Healthy? go.ted.com/carsonbruns 1 December 2018
TEDxMileHigh, Denver, Colorado ***>700,00 Online Views***

9. Passionate Optimization (co-presented with Ben Shapiro) 1 November 2018
ACTIVE Faculty Development and Leadership Program, CU Boulder

8. Skin 19 October 2018
Todd Reed Salon Series, Boulder, CO

7. Tech Tattoos: Tissue Engineering with Dermally Implanted Nanomaterials.
International Symposium on Advanced Molecular Sciences 10 October 2018
East China University of Science and Technology, Shanghai, China

6. Leveraging Artificial Molecular Machines in Active Soft Matter Systems
CU Boulder Active Matter Workshop, Boulder, Colorado 10 August 2018

Prior to CU:

5. Biochemical Applications of Rotaxanes
Molecular Rotors, Motors, and Switches Conference. 21 July 2016
Telluride Science Research Center, Telluride, Colorado

4. Host-Guest Chemistry Inside of Large, Self-Assembled Molecular Flasks
5th Interdisciplinary Science Forum of the JSPS-US-AA 7 November 2014
The University of Florida, Gainesville

3. Emergent Ion-Gated Binding of Host-Guest Complexes Within $M_{12}L_{24}$ Molecular Flasks
248th ACS National Meeting and Exposition, San Francisco 13 August 2014

2. The Art and Science of (re)Presentation and the Mechanical Bond
Molecular Rotors, Motors, and Switches Workshop. 1 July 2014
Telluride Science Research Center, Telluride, Colorado, USA

1. Self-Assembly of Organic-Inorganic Hybrids
Northwestern University Department of Chemistry Organic Seminar 1 March 2011

POSTERS (All Prior to CU)

9. **Bruns, C. J.**; Liu, H.; Finbloom, J. A.; Slack, C. C.; Jeong, K.; Wemmer, D. E.; Pines, A.; Francis, M. B. Utilizing the Mechanical Bonds of Rotaxanes in Bioconjugation and Controlled Release
11th International Symposium on Macrocyclic & Supramolecular Chemistry (ISMSC), Seoul, South Korea 10–14 July 2016

8. **Bruns, C. J.**; Liu, H.; Francis, M. B. Protein Mounted Rotaxanes.
10th International Symposium on Macrocyclic & Supramolecular Chemistry (ISMSC), Strasbourg
Selected as a winner of the Springer ISMSC2015 Poster Prize 28 June–2 July 2015

Bruns, C. J.; Frasconi, M.; Zhu, Z.; Sluysmans, D.; Stupp, S.; Duwez, A.-S.; Stoddart, J. F.

7. Rotaxane-Based Molecular Muscles 7–12 June 2015
Gordon Research Conference on Artificial Molecular Switches and Motors, Easton, MA, USA

6. **Bruns, C. J.**; Frasconi, M.; Zhu, Z.; Sluysmans, D.; Stupp, S.; Duwez, A.-S.; Stoddart, J. F. Rotaxane-Based Molecular Muscles
2015 MRS Spring Meeting, San Francisco, USA 6–10 April 2015

5. **Bruns, C. J.**; Stoddart, J. F. Molecular Switches and Machines with Mechanical Bonds
Molecular Rotors, Switches, and Machines Workshop, Telluride Science Research Center, Telluride, Colorado, USA 30 June–4 July 2014

4. **Bruns, C. J.**; Frasconi, M.; Li, J.; Schneebeli, S. T.; Iehl, J.; Jacquot de Rouville, H.-P.; Hartlieb, K. J.; Cheng, C.; Stupp, S. I.; Voth, G. A.; Stoddart, J. F. Donor-Acceptor Daisy Chain Rotaxanes: Thermally and Electrochemically Switchable Molecular Muscles 16–17 December 2013
RSC Macrocyclic and Supramolecular Chemistry Meeting. University of Glasgow, Scotland

3. **Bruns, C. J.**; Tayi, A. S.; Stupp, S. I.; Stoddart, J. F. From Switchable Mechanical Molecules to Artificial Muscles
DOE Non-Equilibrium Energy Research Center Review. Baltimore, MD, USA 5 April 2012

2. **Bruns, C. J.**; Fahrenbach, A. C.; Fujita, D.; Basu, S.; Fujita, M.; Stoddart, J. F. Pseudorotaxanation Within an Electrostatically-Gated $M_{12}L_{24}$ Coordination Sphere.
5th International Symposium on Macrocyclic & Supramolecular Chemistry (ISMSC), Nara, Japan
Selected as a winner of the Springer ISMSC2010 Poster Prize 6–10 June 2010

1. **Bruns, C. J.**; Thasana, N. Cu^{I}-Mediated Microwave-Assisted Synthesis of Azalamellarins
235th National ACS Meeting. *New Orleans, Louisiana, USA* 6–10 April 2008

PROFESSIONAL MEMBERSHIPS

Phi Beta Kappa Honors Society	Inducted 2008
Phi Lambda Upsilon Honorary Chemical Society, *Alpha Gamma Chapter*	Inducted 2010
JSPS-US Fellows Alumni Association	Inducted 2013
American Chemical Society	2011–Present
Materials Research Society	2015–Present
American Institute of Chemical Engineers	2015–Present
The Society of Rheology	2019–Present

SERVICE

Department / Unit Service

Chair, Graduate Committee, ATLAS Institute	AY 21/22-present
DEI Committee, Paul M. Rady Dept. of Mechanical Engineering	AY 2021/22
External Relations Committee, Paul M. Rady Dept. of Mechanical Engineering	2020–2021
Graduate Committee, ATLAS Institute	2020–present
MCEN Materials Science Preliminary Exam Committee Lead	2019, 2020
ATLAS Executive Committee	2018–2020
Chair, Graduate Engineering Annual Research & Recruitment Symposium	AY 2019/20
Vice Chair, Graduate Engineering Annual Research & Recruitment Symposium	AY 2018/19
CU Boulder Department of Mechanical Engineering Graduate Committee	2018–2020
ATLAS Institute ARPAC Self-Study Committee	AY 2017/18
Miller Institute Multidisciplinary Symposium Planning Committee	AY 2015/16
Northwestern Gelowitz Award Selection Committee	May 2013

College / University Service

Advisory Board, Prospects of Soft Matter Student Club	AY 2021/22
Art is Engineering Pop-Up Workshop, Engineering Center Lobby	3 Mar 2020
ACTIVE Faculty Development Program, Speaker / Advisor	2018, 2019
BOLD Center Partner: Goldshirt interviews, Research 101, Bring Bold Out	2018,2021
Engineering Design Expo Judge	8 Dec 2018

CU Boulder CEAS Soft Materials Faculty Search Committee AY 2017/18

Professional Service

NSF Panelist (DMR / LEAPS-MPS, Panel ID P212676) July 2021
Topic Collection Editor, *Frontiers in Chemistry* 2021–2022
Advisory Board, *Vantis Institute* 2020–present
Editorial Board, *Symmetry* Journal 2019–2020
ad hoc proposal reviewer for ACS Petroleum Research Fund 2018, 2022
ad hoc proposal reviewer for U.S. Department of Energy 2020–2021
ad hoc proposal reviewer for Swiss National Science Foundation 2020
Refereed for *Nature Nanotechnology*, *Nature Chemistry*, *Nature Communications, Journal of the American Chemical Society, Advanced Materials, PNAS, Journal of Chemical Physics, Symmetry, Molecules, Polymers, Biomicrofluidics, Environmental Science: Nano, Materials, Gels, Processes, Chinese Chemical Letters, Nanomaterials, Pharmaceutics, Laser & Photonics Reviews, ACS Macro Letters*

MEDIA RECOGNITION / PRESS COVERAGE

News: *The Conversation*, *Chemical & Engineering News*, *ACS Central Science*, *Colorado Public Radio*, *CBS*, *KUNC*, *Newsy*, *Daily Mail*, *Hindustan Times*, *NRC Handelsblad*, *CU Boulder Today*, *Deutsche Welle*

Magazines: *Inked*, *Chemistry World*, *Elements*, *The Rooster*, *The Coloradoan*, *Drug Discovery News*, *GQ*

Blogs: *TED^{x}MileHigh*, *ThinkBig*

Radio / podcasts: *The Disruptors*, *Underfutures*, WORT Madison, ABC Radio Tasmania

Television: *The History Channel*