Brian Meckes, PhD

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EDUCATION

Northwestern University 2019
IIN Postdoctoral Fellow and *Eden and Steven Romick Fellow*, Chemistry
Advisor: Prof. Chad Mirkin

University of California, San Diego 2015
Ph.D., Bioengineering
Advisor: Prof. Ratnesh Lal; Co-Sponsor: Prof. Gina Sosinsky

Rice University 2009
B.S.B., Bioengineering

POSITIONS

Member 2021-Present
BioDiscovery Institute, University of North Texas

Adjunct Courtesy Faculty 2020-Present
Department of Biological Sciences, University of North Texas

Assistant Professor 2019-Present
Department of Biomedical Engineering, University of North Texas

HONORS & AWARDS

Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities	2021
Eden and Steven Romick Fellowship, Friends of the Weizmann Institute for Science	2017-2019
IIN Postdoctoral Fellowship, Northwestern University	2015-2019
NIH F31 Ruth Kirschstein Predoctoral Fellowship, National Institute for Drug Abuse	2013-2015
James Street Fulton Service Prize, Rice University	2009
CPIMA NSF REU Scholarship, Stanford University	2008
Will Rice College Academic Fellow, Rice University	2007-2009
Amgen Scholar, Amgen Foundation/University of Washington	2007
Louis J. Walsh Scholarship in Engineering, Rice University	2006-2007

PUBLICATIONS

*Denotes Equal Authorship

1) Mathis, K., Kohon, A., Black, S., **Meckes, B.** Light-Controlled Oligonucleotide Directed Cell Programming. ACS Material Au. Submitted
2) Man, K., Liu, J., Liang, C., Corona, C., Story, M. D., **Meckes, B.**, Yang, Y. Biomimetic human lung alveolar interstitium chip with extended longevity. ACS Applied Materials and Interfaces. Submitted. Available as a preprint: https://doi.org/10.1101/2022.12.23.521822
3) Kohon, A., Man, K., Mathis, K., Webb, J., Yang, Y., **Meckes, B**. Nanoparticle targeting of mechanically modulated glycocalyx. Small. Submitted. Available as a preprint: https://doi.org/10.1101/2023.02.27.529887
4) Wang, K., Man, K., Liu, J., **Meckes, B.**, Yang, Y. Dissecting Physical and Biochemical Effects in Nanotopographical Regulation of Cell Behavior. (2023) ACS Nano, 17(3), 2124–2133
5) Lin, M.,* **Meckes, B.*,** Chen, C., Teplensky, M.H., Mirkin, C.A. Controlling IntracellularMachinery via Polymer Pen Lithography Molecular Patterning. (2022) ACS Central Science, 8 (9), 1282-1289.
6) Zhang, W., Callmann, C.E., **Meckes, B.**, Mirkin, C.A. Tumor-Associated Enzyme-ActivatableSpherical Nucleic Acids. (2022) ACS Nano, 16 (7), 10931-10942.
7) Oh, E.,* **Meckes, B.,*** Chang, J., Shin, D., Mirkin, C.A. Controlled Glioma Cancer Cell Migration and Confinement Using Biomimetic Patterned Hydrogels. Accepted. (2022) Advanced NanoBiomed Research. 2100131.
8) Ponedal, A., Sheshuang, Z., Sprangers, A.J., Wang, X.-Q., Yeo, D.C., Lio, D.C.S., Zheng, M., Capek, M., Narayan, S., **Meckes, B.,** Paller, A.S., Xu, C., Mirkin, C.A. Attenuation of Abnormal Scarring Using Spherical Nucleic Acids Targeting Transforming Growth Factor Beta 1. (2020) ACS Appl. Bio Mater. 3 (12), 8603-8610
9) Chen, P-C., Liu, Y., Du, J.S., **Meckes, B.,** Dravid, V.P., Mirkin, C.A. Chain-End Functionalized Polymers for the Controlled Synthesis of Sub-2 nm Particles. (2020) Journal of the American Chemical Society 142 (16), 7350-7355
10) Zhang, W.,* **Meckes, B.,*** Mirkin, C.A. Spherical Nucleic Acids with Tailored and Active Protein Coronae. (2019) ACS Central Sciences 5 (12), 1983-1990. Highlighted in ACS Central Sciences First Reactions https://pubs.acs.org/doi/10.1021/acscentsci.9b01284

11) Cabezas, M.C.,* **Meckes, B.,*** Mirkin, C.A., Mrksich, M. Subcellular Control Over Actin Stress Fiber Formation, Independent of Cell Morphology, Dictates Stem Cell Fate. (2019) ACS Nano 13 (10), 11144-11152
12) Chen, P-C.,* Liu, M.,* Du, J.S., **Meckes, B.,** Wang, S., Lin, H., Wolverton, C., Dravid, V.P., Mirkin, C.A. Configuration of phase boundaries in multi-phase hybrid nanoparticles. (2019) Science 363 (6430), 959-964
13) Kluender, E.J.,* Hedrick, J.L.,* Brown, K.A., Rao, R.S., **Meckes, B.**, Du, J.S., Moreau, L.M., Maruyama, B., and Mirkin, C.A. Catalyst Discovery Through Mega-Libraries of Nanomaterials. (2019) Proceedings of the National Academy of Sciences. 116 (1), 40-45
14) Du, J.S., Chen, P-C., **Meckes, B.,** Kluender, E.J., Xie, Z., Dravid, V.P., Mirkin, C.A. (2018) Evaporation-Induced Coarsening of Ultrafine Au-Pt Nanoparticles in Polymer Nanoreactors. Journal of the American Chemical Society. 140 (23), 7213–7221
15) **Meckes, B.,*** Banga, R.J.,* Nguyen, S.T., Mirkin, C.A. (2018) Enhancing the Stability and Immunomodulatory Activity of Liposomal Spherical Nucleic Acids through Lipid-tail DNA Modifications. Small, 14 (5), 1702909
16) Chen, P-C., Du, J.S., **Meckes, B.,** Huang, L., Xie, Z., Hedrick, J., Dravid, V.P., Mirkin, C.A. (2017) The Structural Evolution of Three-Component Nanoparticles in Polymer Nanoreactors. Journal of the American Chemical Society, 139 (29), 9876-9884
17) Xie, Z.,* Gordiichuck, P.,* Lin, Q-Y., **Meckes, B.,** Chen, P-C., Sun, L., Du, J.S., Zhu, J., Liu, Y., Dravid, V.P., Mirkin, C.A. (2017) Solution-Phase Photochemical Nanopatterning Enabled by High-Refractive-Index Beam Pen Arrays. ACS Nano, 1 (8), 8231–8241
18) Du, J.S.,* Chen, P-C.,* **Meckes, B.,** Xie, Z., Zhu, J., Liu, Y., Dravid, V.P., Mirkin, C.A. (2017) The Structural Fate of Individual Multicomponent Metal-Oxide Nanoparticles in Polymer Nanoreactors. Angewendte Chemie International Edition, 56 (26), 7625–7629
19) Banga, R.J., **Meckes, B.,** Narayan, S.P., Sprangers, A.J., Nguyen, S.T., Mirkin, C.A. (2017). Cross-linked Micellar Spherical Nucleic Acids from Thermoresponsive Templates. Journal of the American Chemical Society. 139 (12), 4278–4281
20) Hwang, M.T.,[*] Landon, P.B.,[*] Mo, A.H., Lee, J., **Meckes, B.,** Glinsky, G.V., Lal, R. (2016). Reusable DNA Nano-Carrier for Capture and Release of Biomolecules. Nanoscale, 7(41), 17397-17403
21) **Meckes, B.,** Ambrosi, C., Barnard, H., Arce, F.T., Sosinsky, G., Lal, R. (2014). Atomic Force Microscopy Shows Connexin26 Hemichannel Clustering in Purified Membrane Fragments. Biochemistry, 53 (47), 7407–7414
22) Landon, P.B., Lee, J., Hwang, M.T., Mo, A.H., Zhang, C., Neuberger, A., **Meckes, B.,** Gutierrez, J.J., Glinsky, G.V., Lal, R. (2014). Energetically Biased DNA Motor Containing a Thermodynamically Stable Partial Strand Displacements State. Langmuir, 30 (46), 14073–14078
23) Alfonta, L.,* **Meckes, B.,*** Amir, L., Schlesinger, O., Ramachandran, S., Lal, R. (2014). Measuring Localized Redox Enzyme Electron Transfer in a Live Cell with Conducting Atomic Force Microscopy. Analytical Chemistry, 86 (15), 7674-7680
24) Kwok, J., Grogan, S., **Meckes, B.,** Teran Arce, F., Lal, R., D'Lima, D. (2014). Atomic force microscopy reveals age-dependent changes in nanomechanical properties of the extracellular matrix of native human menisci: implications for joint degeneration and osteoarthritis. Nanomedicine: Nanotechnology, Biology, and Medicine, 10 (8), 1777–1785
25) Connelly, L.S.,* **Meckes, B.,*** Larkin, J., Gillman, A.L., Wanunu, M., Lal, R. (2014). Graphene Nanopore Support System for Simultaneous High Resolution AFM Imaging and Conductance Measurements. ACS Applied Materials and Interfaces, 6 (7), 5290-5296
26) **Meckes, B.,** Teran Arce, F., Connelly, L.S., Lal, R. (2014). Insulated Conducting Cantilevered Nanotips and Two-Chamber Recording System for High Resolution Ion Sensing AFM. Scientific Reports, 4, 4454
27) Mo, A.H.,* Landon, P.B.,* **Meckes, B.,** Yang, M.M., Glinsky, G.V., Lal, R. (2014). On-demand Four-way Junction DNAzyme Nanoswitch Driven by Inosine-Based Partial Strand Displacement. Nanoscale, 6, 1462-1466
28) Teran Arce, F., **Meckes, B.,** Camp, S.M., Garcia, J.G.N., Dudek, S.M., Lal, R. (2013). Heterogeneous elastic response of human lung microvascular endothelial cells to barrier modulating stimuli. Nanomedicine: Nanotechnology, Biology, and Medicine, 9 (7), 875–884
29) Leiske, D.L., **Meckes, B.,** Miller, C.E., Wu, C., Walker, T.W., Lin, B., Meron, M., Ketelson, H.A., Toney, M.F., Fuller, G.G. (2011). Insertion Mechanism of a Poly(ethylene oxide)-poly(butylene oxide) Block Copolymer into a DPPC Monolayer. Langmuir, 27 (18), 11444–11450

FUNDING

Awarded

UNT Seed Award
Delivery of Nanoparticles across the Blood-Brain-Barrier
Role: PI
Total Award: $10,000 (Meckes 50%)

USDA ARS 2022-2023
Developing New Technologies for Improving Resistance to Fusarium Head Blight
Role: Co-PI; PI: Scofield
Total Award: $228,207 (Meckes 25%)

NIH/NIGMS 2021-2023
Modulating 3D Cellular Connectivity Via Spatially-Controlled Programmable Bonding
Grant Number: R21GM141563
Role: PI
Total Award: $383,151 (Meckes 100%)

UNT COS-CENG Collaboration 2021-2022
Plant Exosome Mimics for Gene Regulation in Fungal Species Affecting Crops
Role: PI;
Total Award: $10,000 (Meckes 50%)

US Barley and Wheat SCAB Initiative/USDA ARS 2021-2022
RNA-Interference Targeting of Fungal Genes for Enhancing FHB Resistance
Grant Number: FY20-SH-004
Role: Co-PI; PI: Scofield
Total Award: $110,628 (Meckes 16.685%)

UNT Summer Research Grant 2020
Nanopatterning for Cell Engineering
Role: PI
Total Award: $5,000 (Meckes 100%)

NIDA/NIH Predoctoral Fellowship 2013-2015
Scanning Ion Conductance Microscope-array for the Study of Ion Channel Clusters
Grant Number: F31DA034562
Role: PI
Total Award: $103,000 (Meckes 100%)

Pending

NIH/NIGMS
Mechanoregulators of Nanoparticle-Cell Interactions at Tissue Interfaces
Grant Number: R35GM150577-01
Role: PI
Total Award: $1,798,070 (Meckes 100%); Scored 30; Pending Council Review

Pew Charitable Trust
High Content Nanoparticle Screening in Complex Tissue Models
Role: PI
Total Award: $300,000 (Meckes 100%)

Welch Foundation
Cell-Hydrogel Hybrid Materials
Role: PI
Total Award: $300,000 (Meckes 100%)

NIH/NCI
Integrated High-Resolution Cell Printing
Grant Number: R01CA287345

Role: PI
Total Award: $1,750,000 (Meckes 100%)

NIH/NCI
Dynamic Biomimetic Human Lung Alveolar Interstitium Chip Arrays to Screen Liposomal Nanoparticles for Lung Cancer Treatment
Role: Co-I; PI: Yang, Y.
Total Award: $3,000,000 (Meckes 33%)

PATENTS

Mirkin, C.A., Zhang, W., **Meckes, B.** (2019) Spherical nucleic acids with tailored and active protein coronae. US/PCT/ 62/903,223; Pending

Mirkin, C.A., Mrksich, M., Cabezas, M.D., **Meckes, B.** (2019) Nanopatterning for Controlling Cell Cytoskeleton. WO2019168980A1; Pending

Mirkin, C.A., **Meckes, B.**, Zhang, W. (2018) Spherical Nucleic Acids (SNAs) with Sheddable PEG Layers. WO2019070890A; Pending

Lal, R., Hwang, M.T., Landon, P.B., Glinskii, G., Mo, A., Ramachandran, S., Lee, J., **Meckes, B.** (2020) Nano-sensors for Nucleic Acid Detection and Discrimination. Granted: US10793898

SERVICE

Member, Awards Committee for the BioDiscovery Institute, UNT	2022-Present
Chair, Graduate Committee for Biomedical Engineering	2022-Present
Member, Institution Biosafety Committee	2022-Present
Faculty Advisor, Bioengineering Honor Society, UNT	2021-Present
Panelist, NSF Grant Programs	2021-2022
Ad Hoc Reviewer, Advanced Science	2020
Panelist, SMART Program, DOD	2020
Editorial Board, Engineered Regeneration	2019-Present
Ad Hoc Reviewer, Journal of the American Chemical Society	2019-Present
Ad Hoc Reviewer, Graduate Women in Science National Fellowship	2019
Ad Hoc Reviewer, Bioconjugate Chemistry	2019-Present
Ad Hoc Reviewer, Nanomedicine: Nanotechnology, Biology, and Medicine	2016-Present
Mentor, Upward Bound Program	2011-2013

TALKS

B. Meckes “Mechanical Regulators of Nanoparticle-Cell Interactions.” Florida Institute for Technology, Department of Biomedical Engineering, (2022). Virtual.

B. Meckes “Mechanical Regulators of Nanoparticle-Cell Interactions.” BioFrontiers, (2022). Denton, TX

B. Meckes “Mechanical Regulators of Nanoparticle-Cell Interactions.” ACS Fall Meeting, (2022). Chicago, IL

B. Meckes “Lithographically Controlling Cell Behavior to Improve Nanotherapeutic Targeting.” IEEE Metrocon, (2021). Fort Worth, TX (virtual)

B. Meckes. “Engineering Biological Systems – Modulating Protein–Material Interfaces at the Nanoscale to Control Cell Behavior.” University of North Texas, BioDiscovery Institute, (2021) Denton, TX

B. Meckes. “Engineering Biological Systems – Modulating Protein–Material Interfaces at the Nanoscale to Control Cell Behavior.” University of North Texas, Department of Mechanical and Energy Engineering, (2020) Denton, TX

B. Meckes. “Engineering Biological Systems – Characterizing and Controlling Structure-Function Relationships at the Nanoscale.” University of North Texas, Department of Biomedical Engineering, (2019) Denton, TX

B. Meckes, R.J. Banga, C.A. Mirkin. “Probing the Stability of Liposomal Spherical Nucleic Acids for Therapeutic Design.” American Chemical Society Annual Meeting, (2017) San Francisco, CA.

B. Meckes, L. Connelly, L. Alfonta, M. Wanunu, R. Lal. “New Conducting Atomic Force Microscopy for Simultaneous Electrical Recording and Imaging of Biomolecules.” AFM-Biomed Conference, (2014) San Diego, CA.

SELECT POSTERS

Montoya, B., Mittal, I., Scofield, S., Shah, J., Meckes, B. Spherical Nucleic Acids for Fusarium graminearum gene regulation. National Fusarium Head Blight Forum. (2022) Tampa, FL

"Development of Biocompatible siRNA Nanoparticles to Mitigate FHB in Wheat" National Fusarium Head Blight Forum. (2021) Virtual Conference.

"Nanopatterned Control Over Cell Cytoskeletal Organization and Fate." Biomedical Engineering Society Annual Meeting. (2018) Atlanta, GA.

"Electrochemical AFM of Surface Modified E. Coli." UC Systemwide Bioengineering Conference. (2013) La Jolla, CA.

"Conducting Atomic Force Microscopy for Simultaneous Imaging of Structure and Ionic Current through Nanopores." 56th Annual Biophysical Society Meeting, (2012) San Diego, CA.

STUDENTS MENTORED

University of North Texas

Katelyn Mathis, M.S. Student/PhD Student, UNT	2020-Present
Afia Ibnat Kohon, PhD Student, UNT	2020-Present
Rishi Koneru, TAMS, UNT	2021-Present
Catherine Wang, TAMS, UNT	2022-Present
Nancy Dankwah, McNair Scholars, UNT	2020-2021
Jeffrey Chuong, TAMS, UNT	2020-2021
Shreya Nallaparaju, TAMS, UNT	2020-2021
Shashwat Limbasia, TAMS, UNT	2019-2021
Elijah Goodrich, Graduate Student, UNT	2019-2021
Noel Salinas, Graduate Student, UNT	2019-2021
Gabriella, Bridges, Graduate Student, UNT	2019-2020
Stephen Black, PhD Student, UNT	2019-Present

Northwestern University

Namrata Ramani, Graduate Student, Northwestern University	2018-2019
Millicent Lin, Graduate Student, Northwestern University	2018-2019
Wuliang Zhang, Graduate Student, Northwestern University	2017-2019
EunBi Oh, Graduate Student, Northwestern University	2015-2019

University of California, San Diego

Qingqing Yang, Graduate Student, UCSD	2014-2015
Amanda Woodcock, Amgen Scholar, UCSD	2013
Nancy Ortiz, Upward Bound Program, UCSD	2012
Adrian Mendez, Upward Bound Program, UCSD	2012
Heather Barnard, Bioengineering NSF REU, UCSD	2012
Cesar Guerrero, Upward Bound Program, UCSD	2011

Teaching

BMEN 4980 — Experimental Course/Research Methods in Biomedical Engineering	2022-Present
BMEN 5007 — Research Methods in Biomedical Engineering	2022-Present
BMEN 5317 — Advanced Biotechnology	2021-Present
BMEN 5315 — Computational Methods in Biomedical Engineering	2019-2022
MTSE 6940 — Individual Research	2019-2021
BMEN 5800 — Special Topics in Biomedical Engineering, Advanced Biotechnology	2020
BMEN 5900 — Special Problems in Biomedical Engineering	2020-Present
BMEN 4310 — Biomedical Modeling	2020-2022