

Michael Rowland Blatchley, Ph.D.

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Department of Biomedical and Chemical Engineering and the BioInspired Institute
Syracuse University, 120 Sims Drive, Bowne Hall 318D
Syracuse, NY 13210

EDUCATION

Postdoctoral Researcher, Chemical and Biological Engineering University of Colorado – Boulder	2019 - 2024 Boulder, CO
Ph.D., Biomedical Engineering Johns Hopkins University <i>Thesis: Reconstructing the vascular regenerative niche with O₂-controllable hydrogels</i>	2019 Baltimore, MD
B.S., Biomedical Engineering Purdue University	2013 West Lafayette, IN

PROFESSIONAL EXPERIENCE

Assistant Professor, Biomedical and Chemical Engineering, Bioinspired Institute Syracuse University	2024 - present Syracuse, NY
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AWARDS AND HONORS

K99/R00 Pathway to Independence Award , NIH NIDDK	2023-2027
American Institute of Chemists Postdoctoral Award , Univ. of Colorado – Boulder	2022
Postdoctoral Recognition Award (Finalist) , Society for Biomaterials	2021
Young Investigator's Day Awardee (Paul Talalay Award) , Johns Hopkins Univ. SOM	2019
BME Student Seminar Series, 2nd Place Seminar , Johns Hopkins Univ. BME	2018
F31 NRSA Individual Predoctoral Fellowship , NIH NHLBI	2017-2019
Predoctoral Fellowship , American Heart Association	2017-2019
1st Place Poster Award , SBE International Conference on Stem Cell Engineering	2016
Graduate Research Fellowship Program Honorable Mention , NSF	2014
Predoctoral Fellowship , National Institutes of Health BME Training Grant	2013-2014
Clinical Research Intern , NIH-Funded through Indiana Univ. SOM and Purdue Univ.	2012
Undergraduate Research Experience , Howard Hughes Medical Institute and Purdue Univ.	2011
Second Team Academic All-American , American Collegiate Rowing Association	2010-2013
Dean's List and Semester Honors , Purdue Univ. School of Engineering	2009-2013
Hoosier Scholar Award , SSACI	2009
Presidential Scholarship , Purdue Univ.	2009-2013

PUBLICATIONS (27 total, 11 as first/co-first author; *indicates authors contributed equally)

- Blatchley MR**, Bera K, Kirkpatrick BE, Yavitt FM, McGrath PS, Dempsey PJ, Anseth KS. Spatiotemporally controlled matrix softening facilitates deterministic crypt formation in iPSC-derived intestinal organoids. In preparation.
- Young MW, Oroke CE, Yavitt FM, **Blatchley MR**, Dempsey PJ, Anseth KS. Development of synthetic photoresponsive hydrogels to direct murine intestinal monolayer differentiation and crypt formation. Submitted.
- Xie X, Wang Y, Deng B, **Blatchley MR**, Lan D, Xie Y, Lei M, Liu N, Xu F, Wei Z. Matrix metalloproteinase-responsive hydrogels with tunable retention for on-demand therapy of inflammatory bowel disease. *Acta Biomaterialia*, 2024. ([link](#))
- Hushka EA, **Blatchley MR**, Macdougall LJ, Yavitt FM, Kirkpatrick BE, Bera K, Dempsey PJ, Anseth KS. Fully synthetic hydrogels promote robust crypt formation in intestinal organoids. *bioRxiv* 2024.07.06.602364. ([link](#))

5. **Blatchley MR**, Anseth KS. Middle-out methods for spatiotemporal tissue engineering of organoids. *Nature Reviews Bioengineering*, 1, 329-345, 2023. ([link](#))
6. Yavitt FM, Kirkpatrick BE, **Blatchley MR**, Speckl KF, Mohagheghian E, Moldovan R, Wang N, Dempsey PJ, Anseth KS. In situ modulation of intestinal organoid epithelial curvature through photoinduced viscoelasticity directs crypt morphogenesis. *Science Advances*, 9 (3), eadd5668, 2023. ([link](#))
7. Cable J, Arlotta P, Parker KK, Hughes AJ, Goodwin K, Mummery CL, Kamm RD, Engle SJ, Tagle DA, Boj SF, Stanton AE, Morishita Y, Kemp ML, Norfleet DA, May EE, Lu A, Bashir R, Feinberg AW, Hull SM, Gonzalez AL, **Blatchley MR**, Pulido NM, Morizane R, McDevitt TC, Mishra D, Mulero-Russe A. Engineering multicellular living systems – A Keystone Symposia report. *Annals of the New York Academy of Sciences*, 2022. ([link](#))
8. Borelli AN, Young MW, Kirkpatrick BE, Jaeschke MW, Mellett S, Porter S, **Blatchley MR**, Sridhar BV, Anseth KS. Stress relaxation and composition of hydrazone-crosslinked hybrid biopolymer-synthetic hydrogels determine spreading and secretory properties of MSCs. *Advanced Healthcare Materials*, 2200393, 2022. ([link](#))
9. Qazi TH, **Blatchley MR**, Davidson MD, Yavitt FM, Cooke ME, Anseth KS, Burdick JA. Programming hydrogels to probe spatiotemporal cell biology. *Cell Stem Cell*, 5 (5), 678-691, 2022. ([link](#))
10. Yavitt FM, Kirkpatrick BE, **Blatchley MR**, Anseth KS. 4D materials with photoadaptable properties instruct and enhance intestinal organoid development. *ACS Biomaterials Science and Engineering*, 2022. ([link](#))
11. **Blatchley MR***, Günay KA*, Yavitt FM, Hawat EM, Dempsey PJ, Anseth KS. In situ super-resolution imaging of organoids and extracellular matrix interactions via photo-transfer by allyl sulfide exchange expansion microscopy (PhASE-ExM), *Advanced Materials*, 2109252, 2022. ([link](#))
12. **Blatchley MR**, Hall F, Ntekoumes D, Cho H, Kailash V, Gerecht S. Discretizing 3D oxygen gradients in hydrogels to modulate and investigate cellular processes, *Advanced Science*, 2100190, 2021. ([link](#))
13. **Blatchley MR**, Gerecht S. Re-constructing the vascular developmental milieu in vitro, *Trends in Cell Biology*, 30 (1), 15-31, 2020. Cover Feature. ([link](#))
14. Wei Z, Volkova E, **Blatchley MR**, Gerecht S. Hydrogel vehicles for sequential delivery of protein drugs to promote vascular regeneration, *Advanced Drug Delivery Reviews*, 149-150, 95-106, 2019. ([link](#))
15. Xiao Y, Chang L, Chen Z, **Blatchley MR**, Zhou J, Xu M, Gerecht S, Fan R. Senescent cells with augmented cytokine production for microvascular bioengineering and tissue repairs, *Advanced Biosystems*, 3 (8), 1970082, 2019. Inside Front Cover. ([link](#))
16. **Blatchley MR**, Hall F, Wang S, Pruitt HC, Gerecht S. Hypoxia and matrix viscoelasticity sequentially regulate endothelial progenitor cluster-based vasculogenesis, *Science Advances*, 5 (3), eaau7518, 2019. ([link](#))
17. **Blatchley MR**, Abaci HE, Hanjaya-Putra D, Gerecht S. Hypoxia and Matrix Manipulation for Vascular Engineering, *Biophysical Regulation of Vascular Differentiation and Assembly*, Ch. 4, 73-119, 2018. ([link](#))
18. Cho H, **Blatchley MR**, Duh EJ, Gerecht S. Acellular and cellular approaches to improve diabetic wound healing, *Advanced Drug Delivery Reviews*, 146, 267-288, 2018. ([link](#))
19. **Blatchley MR**, Gerecht S. Integrin binding: Sticking around vessels, *Nature Materials*, 16 (9), 881-883, 2017. ([link](#))
20. Lewis DM*, **Blatchley MR***, Park KM, Gerecht, S. O₂-controllable hydrogels for studying cellular responses to hypoxic gradients in three dimensions in vitro and in vivo, *Nature Protocols*, 12 (8), 1620-1638, 2017. ([link](#))
21. Smith Q, **Blatchley MR**, Gerecht S. Engineering niches for blood vessel regeneration, *Biology and Engineering of Stem Cell Niches*, Ch. 30, 479-497, 2017. ([link](#))
22. Beachley VZ, Wolf MT, Sadtler K, Manda SS, Jacobs H, **Blatchley MR**, Bader JS, Pandey A, Pardoll D, Elisseeff JH, Tissue matrix arrays for high-throughput screening and systems analysis of cell function, *Nature Methods*, 12, 1197-1204, 2015. ([link](#))
23. **Blatchley MR**, Park KM, Gerecht S. Designer hydrogels for precision control of oxygen tension and mechanical properties, *Journal of Materials Chemistry B*, 3, 40, 7939-7949, 2015. ([link](#))

24. **Blatchley MR**, Gerecht S. Acellular implantable and injectable hydrogels for vascular regeneration, *Biomedical Materials*, 10, 3, 034001, 2015. ([link](#))
25. Park KM, **Blatchley MR**, Gerecht S. The design of dextran-based hypoxia-inducible hydrogels via in situ oxygen consuming reaction, *Macromolecular Rapid Communications*, 35, 22, 1968-1975, 2014. ([link](#))
26. Bonawitz ND, Soltau WL, **Blatchley MR**, Powers BL, Hurlock AK, Seals LA, Weng J, Stout J, Chapple C. The REF4 and RFR1 subunits of the eukaryotic transcriptional coregulatory complex Mediator are required for phenylpropanoid homeostasis in Arabidopsis, *The Journal of Biological Chemistry*, 287, 8, 5434-5445, 2012. ([link](#))
27. Weaver WA, Li J, Wen, YL, Johnston J, **Blatchley MR**, Blatchley III ER. Volatile disinfection by-product analysis from chlorinated indoor swimming pools, *Water Research*, 43, 13, 3308-3318, 2009. ([link](#))

GRANSTMANSHIP

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| NIH K99/R00 Pathway to Independence Award: “4D controllable extracellular matrix properties to guide iPSC-derived intestinal organoid fate and form” (PI: Michael Blatchley) | 2023 - 2027 |
| Arnold and Mabel Beckman Foundation Instrumentation Grant for Advanced Light-Sheet Microscopy and Data Science: (Lead PI: Amy Palmer, co-PIs: Kristi Anseth, Joseph Dragavon) | 2021 |
| NSF Reproducible Cells and Organoids via Directed-Differentiation Encoding (RECODE): “Materials-directed differentiation of intestinal organoids of uniform size and shape” (co-PIs: Kristi Anseth and Peter Dempsey) | 2021 - 2024 |
| NIH NHLBI F31 Predoctoral Fellowship: “Elucidating a mechanism for hypoxic cluster-based vasculogenesis” (PI: Michael Blatchley) | 2017 - 2019 |
| AHA Predoctoral Fellowship: “Elucidating a mechanism for hypoxic cluster-based vasculogenesis” (PI: Michael Blatchley) | 2017 - 2019 |

ORAL PRESENTATIONS

1. **Blatchley MR**, Yavitt FM, McGrath PS, Dempsey PJ, Anseth KS. Spatiotemporally controlled matrix softening facilitates deterministic crypt formation in iPSC-derived intestinal organoids, *Biomedical Engineering Society Annual Meeting*, Seattle, WA, 2023.
2. **Blatchley MR**, Yavitt FM, Hushka EA, McGrath PS, Dempsey PJ, Anseth KS. Engineering intestinal morphogenesis with synthetic hydrogels, *FASEB Science Research Conference: The Gastrointestinal Epithelium Conference (invited)*, Steamboat Springs, CO, 2023.
3. **Blatchley MR**. Constructing and characterizing 4D tissue models. *Invited department seminars* (University of Wisconsin – Madison, University of Notre Dame, Syracuse University, Dartmouth College, Purdue University, Cornell University, University at Buffalo), 2023.
4. **Blatchley MR**, Dempsey PJ, Anseth KS. Synthetic hydrogels to characterize and control ECM dynamics of intestinal organoids, *CU Anschutz Department of Pediatrics, Section of Developmental Biology Seminar (invited)*, Aurora, CO, 2022.
5. **Blatchley MR**, Günay KA, Yavitt FM, Hawat EM, Dempsey PJ, Anseth KS. In situ super-resolution imaging of organoids and extracellular matrix interactions via photo-expansion microscopy, *Materials Research Society Spring Meeting*, Honolulu, HI, 2022.
6. **Blatchley MR**, Günay KA, Yavitt FM, Hawat EM, Dempsey PJ, Anseth KS. In situ super-resolution imaging of organoids and extracellular matrix interactions via photo-expansion microscopy, *Society for Biomaterials Denver Monthly Meeting (invited)*, Denver, CO, 2022.
7. **Blatchley MR**, Yavitt FM, LeFevre JE, McGrath PS, Dempsey PJ, Anseth KS. Photopatterning facilitates deterministic crypt formation in iPSC-derived intestinal organoids, *Society for Biomaterials Annual Meeting*, Baltimore, MD, 2022.

8. **Blatchley MR**, Günay KA, Yavitt FM, Hawat EM, Dempsey PJ, Anseth KS. In situ super-resolution imaging of organoids and extracellular matrix interactions via photo-expansion microscopy, *Society for Biomaterials Annual Meeting*, Baltimore, MD, 2022.
9. **Blatchley MR**, Günay KA, Yavitt FM, Hawat EM, Dempsey PJ, Anseth KS. In situ super-resolution imaging of organoids and extracellular matrix interactions via photo-expansion microscopy, *Keystone Symposia: Engineering Multi-Cellular Living Systems (Joint with Organoids as Tools for Fundamental Discovery and Translation)*, Keystone, CO, 2022.
10. **Blatchley MR**, Günay KA, Yavitt FM, Hawat EM, Dempsey PJ, Anseth KS. Adaptable hydrogels engineered for in situ super-resolution imaging of organoids and extracellular matrix interactions via photoexpansion microscopy, *Wellcome Connecting Science Organoids: Advances and Applications Conference*, conference held virtually September 28-30, 2021.
11. **Blatchley MR**, Günay KA, Yavitt FM, Dempsey PJ, Anseth KS. Synthetic hydrogels to study ECM dynamics of intestinal organoids, *Society for Biomaterials Annual Meeting*, conference held virtually April 20-23, 2021.
12. **Blatchley MR***, Günay KA*, Yavitt FM, Dempsey PJ, Anseth KS. Photopolymerized hydrogels for expansion microscopy of intestinal organoids, *Biomedical Engineering Society Annual Meeting*, conference held virtually October 14-17, 2020.
13. **Blatchley MR**, Gerecht S. Re-constructing the vascular regenerative niche to investigate blood vessel formation, *Young Investigators' Day Ceremony Lecture*, Baltimore, MD, 2019.
14. **Blatchley MR**, Hall F, Wang S, Pruitt HC, Gerecht S. Hypoxia and matrix viscoelasticity sequentially regulate endothelial progenitor cluster-based vasculogenesis, *BME Department Seminar*, Baltimore, MD, 2018.
15. **Blatchley MR**, Gerecht S. Designing hydrogels to guide cellular Responses during development, vascular morphogenesis and tumor growth, *The 7th International Symposium of Green MAP Center and LPIC*, Yamagata University, Yonezawa, Japan, 2018.
16. **Blatchley MR**, Wang S, Hall F, Gerecht S. Oxygen-controllable hydrogels to study hypoxic, cluster-based vasculogenesis, *Biomedical Engineering Society Annual Meeting*, Phoenix, AZ, 2017.
17. **Blatchley MR**, Park KM, Gerecht S. Designer polymeric hydrogels for independent control of oxygen tension and mechanical properties, *Materials Research Society Fall Meeting*, Boston, MA, 2015.

POSTER PRESENTATIONS

1. **Blatchley MR**, Yavitt FM, LeFevre JE, McGrath PS, Dempsey PJ, Anseth KS. Photopatterning facilitates deterministic crypt formation in iPSC-derived intestinal organoids, *Biomedical Engineering Society Annual Meeting*, San Antonio, TX, 2022
2. Macklin BL, **Blatchley MR**, Hall F, Smith Q. Lessons and future directions in open-access, Twitch-based science communication, *Biomedical Engineering Society Annual Meeting*, San Antonio, TX, 2022.
3. **Blatchley MR**, Günay KA, Yavitt FM, Hawat, EM, Dempsey PJ, Anseth KS. In situ super-resolution imaging of organoids and extracellular matrix interactions via photo-expansion microscopy, *Gordon Research Seminar & Conference: Signal Transduction by Engineered Extracellular Matrices*, Manchester, NH, 2022.
4. **Blatchley MR**, Günay KA, Yavitt FM, Hawat, EM, Dempsey PJ, Anseth KS. In situ super-resolution imaging of organoids and extracellular matrix interactions via photo-expansion microscopy, *Keystone Symposia: Engineering Multi-Cellular Living Systems (Joint with Organoids as Tools for Fundamental Discovery and Translation)*, Keystone, CO, 2022.
5. **Blatchley MR**, Günay KA, Yavitt FM, Dempsey PJ, Anseth KS. Synthetic hydrogels to study ECM dynamics of intestinal organoids, *Biomedical Engineering Society Annual Meeting*, attended the conference virtually October 6-9, 2021.
6. **Blatchley MR**, Günay KA, Yavitt FM, Dempsey PJ, Anseth KS. Synthetic hydrogels to study ECM dynamics of intestinal organoids, *Digestive Disease Week*, conference held virtually May 21-23, 2021.
7. **Blatchley MR**, Gerecht S. Layered O₂-controllable hydrogels to identify the mechanism of cluster-based vasculogenesis, *World Biomaterials Congress*, Glasgow, Scotland. Abstract accepted, conference postponed due to COVID-19 (*did not attend the re-scheduled 2020 virtual meeting*).

8. **Blatchley MR**, Hall F, Wang S, Pruitt HC, Gerecht S. Hypoxia and matrix viscoelasticity sequentially regulate endothelial progenitor cluster-based vasculogenesis,” *Society for Biomaterials Annual Meeting*, Seattle, WA, 2019. Poster accepted as ‘late breaking’ submission.
9. **Blatchley MR**, Hall F, Wang S, Pruitt HC, Gerecht S. Hypoxia regulates cluster-based vasculogenesis, *Biomedical Engineering Society Annual Meeting*, Atlanta, GA, 2018.
10. **Blatchley MR**, Hall F, Wang S, Pruitt HC, Gerecht S. Hypoxia regulates cluster-based vasculogenesis, *Gordon Research Seminar & Conference: Signal Transduction by Engineered Extracellular Matrices*, Andover, NH, 2018.
11. **Blatchley MR**, Hall F, Wang S, Pruitt HC, Gerecht S. Hypoxia regulates cluster-based vasculogenesis, *INBT Advanced Biomanufacturing Symposium*, Baltimore, MD, 2018.
12. **Blatchley MR**, Hall F, Wang S, Pruitt HC, Gerecht S. Hypoxia regulates cluster-based vasculogenesis, *Johns Hopkins Cardiovascular Research Retreat*, Baltimore, MD, 2018.
13. **Blatchley MR**, Wang S, Hall F, Gerecht S. Elucidating a mechanism for hypoxic, cluster-based vasculogenesis, *INBT Vascularization Symposium*, Baltimore, MD, 2017.
14. **Blatchley MR**, Wang S, Hall F, Gerecht S. Elucidating a mechanism for cluster vasculogenesis using in vitro engineered hydrogels, *Society for Biological Engineering, International Conference on Stem Cell Engineering*, Toronto, ON, 2016.
15. **Blatchley MR**, Wang S, Gerecht S. Hypoxia-inducible hydrogels to study vascular morphogenesis, *INBT Precision Medicine Symposium*, Baltimore, MD, 2016.
16. **Blatchley MR**, Schweitzer K, Petrache I. Evidence of a paracrine crosstalk between the bone marrow and the lung, *SEED Poster Session*, Indianapolis, IN, 2012.
17. **Blatchley MR**, Bonawitz ND, Soltau WL, Chapple C. Mutations in the Mediator complex alter the expression of phenylpropanoid biosynthetic genes in *Arabidopsis thaliana*, *Howard Hughes Medical Institute Summer Undergraduate Research Poster Session*, West Lafayette, IN, 2011.

TEACHING EXPERIENCE

Lecturer, System Analysis of Cells & Tissues (Extracellular Matrix lectures)	Spring 2021
Teaching assistant, Tissue Engineering	Spring 2017
Teaching assistant, BME Modeling and Design	Fall 2016
Guest lecturer, Bioengineering in Regenerative Medicine (Biomaterials lecture)	Spring 2016
Laboratory instructor, Nano-Biotechnology, Certificate of Advanced Study (3D cell culture lab)	Spring 2016

LEADERSHIP AND OUTREACH

BMES Annual Meeting , Session Moderator	2023
GRS Signal Transduction by Engineered Extracellular Matrices , Discussion Leader	2022
The Paper Trail (Twitch-based online journal club: link) , Co-Founder	2021 - present
Postdoctoral Association of Colorado (Boulder) , Co-President	2021 - 2022
CU Science Ambassador	2020
Trainee Symposium for Organoids & Organs-on-Chip , Session Moderator	2020
Postdoctoral Association of Colorado (Boulder) , Advisory Committee Member	2019 - 2021
Gerecht Lab Journal Club , Creator and Organizer	2017 - 2019
Johns Hopkins University BME PhD Council , President	2014 - 2015
Science Outreach Program	2014
Thread Mentoring Program	2013 - 2019
Alpha Eta Mu Beta (The BME Honor Society), Purdue University	2011 - 2013
Tau Beta Pi (The Engineering Honor Society)	2010 - 2013
Purdue Rowing Team	2009 - 2013

MENTORING

Graduate students

- JHU: Franklyn Hall, BME PhD student, 2017-2019
- JHU: Lin Lu, MS Chemical and Biomolecular Engineering, 2015-2016

Undergraduate students

- CU Summer Student: Cora Ferguson, St. Lawrence University, Summer 2021
- CU Boulder (UROP-Funded): Elijah Hawat, Chemical and Biological Engineering, 2021-2023
- CU Boulder (SURE Fellowship Program): Jasmine LeFevre, Integrative Physiology, 2021-2023
- CU Boulder (Senior Thesis): Kelly Speckl, Chemical and Biological Engineering, 2021-2022
- JHU: Vidur Kailash, BS Biophysics, 2016-2019
- JHU: Songnan Wang, BS Chemical and Biomolecular Engineering; Provost's Undergraduate Research Award recipient, 2015-2017; current position MD Student Stanford University
- JHU: Arianne Papa, BS Biomedical Engineering, 2016-2017; current position PhD student Columbia University
- REU: Franklyn Hall, Mississippi State University; Summers 2015, 2016; current position PhD student Johns Hopkins University
- BME graduate student mentoring group: Organization developed by graduate students to mentor undergraduates and provide information about applying to succeeding in graduate school

High school student

- Brooke Smith, Baltimore Polytechnic Institute, Women Serious About Science Program, 2014-2015

Laboratory technicians

- Syracuse: Dominic Tigani, laboratory technician, 2024-present
- JHU: Michael Cho, laboratory technician, 2018-2019

RESEARCH EXPERIENCE

PhD Research

Johns Hopkins University, Baltimore, MD
Principle Investigator: Dr. Sharon Gerecht

Spring 2014 – Summer 2019

PhD Lab Rotation

Johns Hopkins University, Baltimore, MD
Principle Investigator: Dr. Jennifer Elisseeff

Fall 2013

NIH Funded Clinical Internship

IU School of Medicine, Indianapolis, IN
Principle Investigator: Dr. Irina Petrache

Summer 2012

HMI Undergraduate Research Experience

Purdue University, West Lafayette, IN
Principle Investigator: Dr. Clint Chapple

Summer 2011

Research Intern, Akina, Inc.

Akina, Inc., West Lafayette, IN
Principle Investigator: Dr. Kinam Park, Manager: John Garner

Summer 2010

Research Assistant, Civil Engineering

Purdue University, West Lafayette, IN
Principle Investigator: Dr. Ernest Rowland Blatchley III

Summer 2008

REVIEWING AND SERVICE ACTIVITIES

Peer-reviewed journals:

Science Advances

Advanced Drug Delivery Reviews

Nature Reviews Methods Primers

Nature Materials, Nature Biotechnology, PNAS, Biomaterials, Advanced Materials (with mentors)

Conference abstracts:

Biomedical Engineering Society Annual Meeting

Fellowships/Awards:

Postdoctoral Travel Award (University of Colorado)

Research/Outreach Grant (University of Colorado)
