

MATTHEW L BECKER

W. Gerald Austen Professor of Polymer Science & Polymer Engineering
Professor of Polymer Science and Biomedical Engineering

Associate Dean for Research
College of Polymer Science & Polymer Engineering
The University of Akron
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PROFESSIONAL HISTORY

The University of Akron

2016 – present	W Gerald Austen Professor of Polymer Science & Polymer Engineering
2016 – present	Associate Dean for Research, College of Polymer Science & Polymer Engineering
2014 – present	Professor of Polymer Science
2014 – present	Professor of Biomedical Engineering
2009 – present	Integrated Bioscience Program
2010 – 2016	Director – Akron Functional Materials Center
2009 – 2014	Associate Professor of Polymer Science

Austen Bioinnovation Institute in Akron

2011 – 2014	Director – Center for Biomaterials in Medicine
2010 – 2012	Leader – Orthopaedic Technology Platform

National Institute of Standards and Technology - Polymers Division

2005-2009	Staff Scientist & Project Leader – Bioimaging and Tissue Engineering
2003-2005	NRC Postdoctoral Fellow – Eric J. Amis, Ph.D. - Advisor

EDUCATION

Ph.D. Washington University, Organic Chemistry, *August 2003*
Advisor: Professor Karen L Wooley, Thesis: “Regioselective Labeling of Block Copolymers, Incorporation into Nanostructures, and Evaluation of Biological Activity”

M.A. Washington University, Organic Chemistry, *August 2000*

B.S. Northwest Missouri State University, Chemistry, ACS Accredited, *May 1998*

RESEARCH INTERSTS

The Becker Laboratory for Functional Biomaterials focuses on developing macromolecular solutions for unmet medical needs. We are primarily a materials chemistry group synthesizing well defined polymers and macromolecular materials for medical applications. These highly functional materials are designed to stimulate and influence specific cell functions. The knowledge gained from these studies impacts numerous areas in biomaterials and additive manufacturing including, orthopaedics, tissue engineered vascular grafts, peripheral nerve repair, regenerative medicine, antimicrobials, drug and protein delivery systems and the detection of disease states.

PROFESIONAL SOCIETIES

American Association of Arts and Sciences
Society for Biomaterials
American Chemical Society, Divisions of Polymer Chemistry, Polymer Materials Science & Engineering

HONORS AND AWARDS

2017	Chair, Polymers Gordon Research Conference
2016	W. Gerald Austen Endowed Professor of Polymer Science & Polymer Engineering
2016	Plenary Lecture - Distinctive Voices - National Academy of Sciences
2016	Kavli Fellow, US Frontiers of Science - National Academy of Sciences

2016	Outstanding Faculty Research Award, The University of Akron
2015	ACS Publications - Biomacromolecules/ Macromolecules Young Investigator Award
2015	Vice-Chair, Polymers Gordon Research Conference
2015	Plenary Lecture, BimatE – Biopolymer Materials and Engineering, Slovenia “Building Bone from Polymers: An Unconventional Approach”
2014	Plenary Lecture, Plastics In Medical Devices 2014, “Choosing the right materials & Innovations on the horizon”
2014	Plenary Lecture, The University of Michigan Innovation Symposium, “Building an innovation culture using open innovation”
2012	ACS PMSE Young Investigators Symposium
2006	Core Faculty Member – RESBIO - New Jersey Center for Biomaterials
2003-2005	National Research Council Postdoctoral Fellowship
2001-2003	NIH Chemistry-Biology Interface Pre-doctoral Training Fellowship
2000	Dean’s Award for Teaching Excellence – Washington University
1998, 1999	Department of Chemistry Teaching Award – Washington University
1998	Outstanding Graduate in Chemistry
1997	Team Captain & 4-Year Letterman, Varsity Football
1996	Martin Kanne Chemistry Alumni Scholarship
1995	J. Gordon Strong Chemistry Scholarship

PATENTS & APPLICATIONS

- 1) ML Becker, H Fang, X Li, D Pan, R Rossin, X Sun, J-S Taylor, JL Turner, MJ Welch, KL Wooley “Cell Permeable Nanoconjugates of Shell-Crosslinked Knedel (SCK) and Peptide Nucleic Acids (PNA’s) with Uniquely Expressed or Over-Expressed mRNA Targeting Sequences for Early Diagnosis and Therapy of Cancer.” Filed October 14, 2005, PCT Int. Appl. 2006, WO 2006044716. US Pat No. 2006159619. US Patent 8,354,093
- 2) JA Fagan, ML Becker “Length Fractionation of Carbon Nanotubes using Density Differentiation” Application number is 60/939,915.
- 3) W Tang, ML Becker “Local Delivery of BMP Peptide Fragments using Multivalent Hydroxyapatite-binding Dendrons” UA 873. Application number PCT/US2014/44060
- 4) ML Becker, F Lin, F Harris, R Katsarava, M Graham “Peptide Crosslinked Poly(ester urea) for Orthopaedic Applications” UA 908, WO 2012/166,594.
- 5) ML Becker, J Zheng, J Hao, RA Weiss “Strain Promoted Crosslinking of PEG-based Hydrogels via Copper Free Cycloaddition” UA 991. PCT/US2013/52801
- 6) ML Becker “An Innovative Polymeric Alternative to PMMA Bone Cement for Antibiotic Elution” UA 993
- 7) ML Becker, DH Reneker, J Zheng “Polymeric structures containing strained cycloalkyne functionality for post-fabrication of degradable polymer nanofibers. PCT/US2013/52971
- 8) ML Becker, F Lin “Methods for Post-Fabrication Functionalization of Poly(ester urea)s” UA 1071
- 9) ML Becker, Y Gao, DH Reneker, “, Resorbable, Amino Acid-Based Poly(ester urea)s Scaffold for Vascular Graft Tissue Engineering. This application was filed 10/29/2013 UA 1088 - USPTO: 61/896,687
- 10) ML Becker, A Isayev, BK Weiner, E Tasciotti “Modular Device for Preventing Compression and Instability in a Segmental Defect Repair Scaffold” UA 1133 - PCT US2015/030,530
- 11) ML Becker, S Li “Metal Free, Degradable Radiopaque Poly(ester urea)” UA 1134,
- 12) ML Becker, W Tang “Methods and Molecules for Tethering Bioactive Peptides to Metal Oxide Surfaces. UA 1147. PCT/US2014 - **LICENSED**
- 13) ML Becker, D Dean, Y Luo Scalable Method for the Synthesis and Functionalization of Well-Defined Degradable Poly(propylene fumarate)” UA 1148 - U.S. Serial No. PCT 62/081219 - **LICENSED**
- 14) ML Becker, J Zhou, A Defante, A Dhinojwala “ Degradable poly(ester urea) adhesives for medical applications” UA, 1150 - PCT 62/027,487
- 15) ML Becker, J Yu “UA 1188, Hyperbranched Amino Acid-Based Poly(ester ureas) for Regenerative Medicine and Drug Delivery. This application was filed 11/12/2014 PCT/US14/939,216
- 16) ML Becker, MB Wade, Z Zander “UA1202, “Decellularized Tissue/Nanofiber/Hydrogel Hybrid for Optimized Tissue Regeneration. This application was filed 2/16/2015 - PCT/US16/18043.

- 17) ML Becker "Controlling porosity in electrospun polymer meshes" UA, 1165
- 18) ML Becker, J Zheng "UA 1201, Polypeptide-based Ionic Polymer for Protein Stabilization". This application was filed 2/17/2015 USPTO: 62/117159.
- 19) ML Becker, ZK Zander, RA Weiss, F Wang, D Wardius – "Softening Thermoplastic Polyurethanes Using Ionomer Technology. UA 1215 – USPTO: 15/166,753.
- 20) ML Becker, AP Dove, C, Bell, V Truong, J Yu – "Biomimetic rubber via Solvolysis control of Stereochemistry in a step growth polymerization UA 1222 - USPTO: 62/211,367
- 21) ML Becker, GM Policastro, D Dean – "Method for tethering Bioactive Groups to 3D Printed Scaffolds"
- 22) ML Becker, V Bhaget – UA 1273, "Phosphorylated Poly(ester-urea) Based Biomimetic Degradable Tissue Adhesives" USPTO: 62/328,653.
- 23) JA Wilson, ML Becker – "Methods for synthesizing end functionalized PPM and PPF
- 24) JA Wilson, ML Becker – Methods for synthesizing functional PPM and PPF block copolymers
- 25) JA Wilson, ML Becker – Methods for synthesizing PPM and PPF copolymers with epichlorohydrin
- 26) ZK Zander, ML Becker, A Chiari, S Chambers "Post polymerization functionalization of polyurethanes with QACs for imparting multispectral antimicrobial properties"

COMMERCIAL ENTERPRISE

21st Century Medical Technology, LLC

Equity holder, Scientific Advisory Board Member (2015)

3D BioActives, LLC

Founder & Board Member (2015)

3D BioResins, LLC

Co-founder, & Board Member (2015)

PROFESSIONAL SERVICE

American Chemical Society

Division of Polymeric Material Science and Engineering

National Programming Chair (2011 – 2015)

Treasurer (2014 – 2017)

Biomacromolecules – Editorial Advisory Board (2012 – present)

Royal Society of Chemistry

Polymer Chemistry – Editorial Advisory Board (2016 – present)

The University of Akron

University of Akron

Academic Integrity Hearing Committee (2016 – present)

Dean Search Committee –College of Polymer Science and Polymer Engineering (2014)

University Faculty Athletics Committee – (2011–2015)

Steering Committee – Austen Bioinnovation Institute (2010-2014)

College of Polymer Science and Polymer Engineering

Research Council (2015 – present)

Director – Akron Functional Materials Center (2010-2016)

Co-Director NSF-REU in Polymer Science and Polymer Engineering (2010-2016)

NMR Committee Chairman (2010 – 2013)

Search Committee – Safety Coordinator (2015)

Search Committee – Director of Finance (2015)

Department of Polymer Science

Assistant Professor of Polymer Chemistry Search Committee Chair (2016)

Curriculum Committee (2009 – present)

Assistant Professor of Polymer Education Search Committee Chair (2016)

Recruiting and Admissions Committee Chair (2009 - 2016)

RTP Committee Chair A Joy (2010 – 2016)
Ohio Research Scholar Biomaterials Search Committee Chair (2009)
Ohio Research Scholar Advanced Materials Search Committee Chair (2009)
Assistant Professor of Polymer Chemistry Search Committee Chair (2012)

Austen Bioinnovation Institute in Akron

Director, Center for Biomaterials in Medicine (2012 – 2014)
Director, Center for Biomaterials in Medicine – Orthopedic Technology Platform (2010 – 2012)
Center for Biomaterials in Medicine Steering Committee (2009 – 2013)
CE PoliMat -Scientific Advisory Board (2013 – 2014)
CEO Search Committee (2009)

National Institute of Standards and Technology

Coordinated the collaborative efforts between the Polymers Division and:
1) The New Jersey Center for Biomaterials at Rutgers University (Professor J Kohn, Director)
2) The Tissue Engineering Resource Center at Tufts University (Professor DL Kaplan, Director)
3) Armed Forces Institute for Pathology (Col. GD Sandberg MD, Research Director)
Reviewer of Construction Grant Proposals – 2008
Reviewer of Advanced Technology Program Proposals – 2007
MSEL Water Initiative committee – 2007
MSEL NanoEHS coordination team - 2008

Department of Defense

Reviewer of ARO Proposals – 2015, 2014, 2013, 2012

Department of Energy

Reviewer of DOE Proposals – 2014, 2012, 2006

National Science Foundation

NSF Review Panel – (DMR) – Biomaterials – 2016 (9)
NSF Site Visit Team – (DMR) – MRSEC - 2015
NSF Review Panel – (DMR) – Biological Gels and Regenerative Medicine 2012(14)
NSF Review Panel – (DMR) – Materials World Network – 2009, 2010, 2012
NSF Review Panel – (DMR) – Biomaterials “Tissue Engineering Scaffolds” – 2007
Reviewer of NSF Proposals – Division of Materials Research 2005, 2006, 2007, 2008, 2009, 2014, 2016. CAREER 2010, 2011, 2012, 2014, 2015

Reviewer for Scholarly Journals:

Journal of the American Chemical Society, Biomacromolecules, ACS Macro Letters, Advanced Materials, Advanced Functional Materials, Advanced Healthcare Materials, Biomaterials, Acta Biomaterialia, Macromolecules, Angewandte Chemie Int. Ed., Journal of Polymer Science A: Polymer Chemistry, Langmuir, Chemical Communications, Biomaterials Science, Polymer Chemistry,

BOOK CHAPTERS

- 1) NM Moore, ML Becker* “Bioactive Self Assembled Monolayer (SAM) Gradients” Soft Matter Gradient Surfaces: Methods & Applications, Ed: Jan Genzer, John Wiley & Sons (2012)
- 2) MC Weiger, J Kohn, ML Becker* “Advancing SPRi Measurements with a Novel Hydroxyapatite Biosensor” ACS Symposium Series, **2010**, Vol .1054, (5), 109-124.

REFEREED PUBLICATIONS

(> 3900 citations, H-Index 35 - *corresponding author, †undergraduate)

- 123) E Silantjeva, C Liu, O Manahan, RK Willits*, ML Becker* Peptide concentration gradients of YIGSR and GRGDS to direct primary Schwann cell migration into peripheral neural defects. *Biomaterials* **2016**, submitted.

- 122) A Kleinfehn, JA Wilson, ML Becker* "Functionalization of 3D scaffolds post photochemical printing using reactive end groups *Advanced Materials*, **2016**, *submitted*.
- 121) JA Wilson, ML Becker* "Magnesium catalyzed polymerization of end functionalized poly(propylene maleate) and poly(propylene fumarate) *J. Amer. Chem. Soc.*, **2016**, *submitted*.
- 120) C Kirchofer, GM Policastro, ML Becker, AP Dove "Elastomeric, Degradable Cyclic Tyrosine-based Polyurethanes" *J. Amer. Chem. Soc.*, **2016**, *submitted*.
- 119) EP Childers, MB Wade, A Ellenberger[†], D Orsini, RA Bell, SD Fening, ML Becker* "PEU sponge for bone tendon interface repair materials – suture retention strength. *Biomaterials* **2016**, *submitted*.
- 118) Y Gao, A Land, Y Xu, GM Policastro, J Harris[†], T Ritzman*, ML Becker*, "Extended delivery of hGH from polymeric nanofibers" *ACS MacroLetters*, **2016**, *submitted*.
- 117) H Wang, RA Weiss, ML Becker* "Molecular Mass Dependent Mechanical Properties in Metal-Free Click Hydrogels" **2016**, *submitted*.
- 116) H Li, J Zheng, H Wang, ML Becker, N Leipzig* "Neural stem cell differentiation in strain promoted crosslinked PEG-based Hydrogels" **2016**, *submitted*.
- 115) C Motta, Q Li, D Orsini, EP Childers, MF Delisio, SD Weiner, ML Becker* "Optimizing Chondrocyte expansion on surface energy gradients" *ACS Combinatorial Science* **2016**, *submitted*.
- 114) Y Xu, GM Policastro, JM Walker, Y Luo, A Kleinfehn, D Dean, ML Becker, "Accelerated hMSC differentiation on OGP derivatized PPF Bioglass composite scaffolds", *Biomaterials* **2016**, *submitted*.
- 113) J Yu, GV Seifert, S Li, ML Becker* "Amorphous Calcium Phosphate Composites of L-Phenylalanine-based poly(ester urea)s", *ACS Applied Materials and Interfaces*, **2016**, *submitted*.
- 112) JM Walker, E Bodamer, O Krebs, A Kleinfehn, Y Lou, ML Becker, David Dean "3D Printing High Resolution Resorbable Poly(Propylene Fumarate) Bone Tissue Engineering Scaffolds" *Acta Biomaterialia*, **2016**, *submitted*.
- 111) R Dilla, Y Xu, ZK Zander, N Bernard[†], CG Weiner, BD Vogt, ML Becker* Mechanically tunable, PEG-Oxime Hydrogels with Invariant Composition, Concentration, and Stoichiometry" *Advanced Materials*, **2016**, *submitted*.
- 110) GM Policastro, ML Becker* "Enhanced Bioactivity of OGP-Crosslinked Poly(ester urea)" *Polymer Chemistry* **2016**, *submitted*.
- 109) SL Vega, E Liu, N Bennett, V Arvind, J Bushman, H-J Sung, ML Becker, J Kohn, P-A Vidi, S Lelièvre, PV Moghe* "High Content Morpho-Textural Imaging of Nuclear Organization Can Parse Emergent Cell Phenotypes" *PLoS One*, **2016**, *submitted*.
- 108) JJ Kim, NK Bennett, MS Devita, S Chahar, S Viswananth, EA Lee, G Jung, PP Shao, EP Childers, S Liu, A Kulesa, BA Garcia, ML Becker, NS Hwang, A Madabhushi, MP Verzi, PV Moghe* "Epi-Mark Descriptor Imaging of Cell Transitional States (EDICTS): Optical High Content Nanoscopy to Forecast Functional Divergence in Stem Cells" *Scientific Reports*, **2016**, *submitted*.
- 107) K Chen, J Yu, G Guzman, SS Es-haghi, ML Becker, M Cakmak* "Nonlinear Mechano-Optical Behavior of L-Phenylalanine-based Poly(ester urea)s: Local Order in Amorphous Polymers" *Macromolecules* **2016**, *submitted*.
- 106) GI Peterson, AV Dobrynin, ML Becker* α -Amino Acid-Based Poly(Ester Urea)s as Multi-Shape Memory Polymers for Biomedical Applications, *ACS Macro Letters*, **2016**, 5 (10), 1176–1179. [Citations: 0.](#)
- 105) V Bhaget[^], J Zhou[^], ML Becker* "Poly(ester urea) Based Adhesives: Improved Deployment and Adhesion by Incorporating Poly(propylene glycol) Segments" *ACS Applied Materials and Interfaces* **2016**, *in press*. [Citations: 0.](#) ([^]*co-first authors*)
- 104) A Alalwiat, W Tang, S Gerişlioğlu, ML Becker, C Wesdemiotis* Mass Spectrometry and Ion Mobility Characterization of Bioactive Peptide - Synthetic Polymer Conjugates, *Analytical Chemistry*, **2016**, *in press*. [Citations: 0.](#)
- 103) EP Childers, GI Peterson, AB Ellenberger[†], K Domino[†], GV Seifert, ML Becker* "Adhesion of Blood Plasma Proteins and Platelet-rich Plasma on L-Valine Based Poly(ester urea)" *Biomacromolecules*, **2016**, 17(10), 3396-3403. [Citations: 0.](#)

- 102) C Bell, J Yu, IA Barker, V Truong, Z Cao, AV Dobrynin, ML Becker*, AP Dove* "Independent Control of Elastomer Properties through Stereocontrolled Synthesis" *Angew Chem. Int. Ed.* **2016**, 55(42), 13076-13080. [Citations: 0.](#)
- 101) MB Wade, E Roderburg, U Patel, B Shah, ML Becker* "In vitro and in vivo evaluation of electrospun poly(ester urea)s as hernia repair mesh materials" *Biomacromolecules*, **2016**, 17(10), 3363-3374. [Citations: 0.](#)
- 100) V Bhaget, E' OBrien[†], J Zhou, ML Becker* "Caddisfly Inspired Phosphorylated Poly(ester Urea)s for Bone Adhesives" *Biomacromolecules*, **2016**, 17, 3016-3024. [Citations: 0.](#)
- 99) Y Gao, T Yi, T Shinoka, YU Lee, DH Reneker, CK Breuer* ML Becker*, "Pilot Mouse Study of 1 mm Inner Diameter (ID) Vascular Graft Using Electrospun Poly(ester urea) Nanofibers" *Advanced Healthcare Materials*, **2016**, 5(18), 2427-2436. [Citations: 0.](#)
- 98) M Castano, A Alvarez, ML Becker, JE Puskas* "Synthesis of Polyisobutylene-Polycaprolactone Block Copolymers using Enzyme Catalysis", *Express Polymer Letters* **2016**, 10(8), 693-700. [Citations: 2.](#)
- 97) X. Li, S Murthy, ML Becker, RA Latour, "Multiscale Modeling of A Polyethylene Glycol (PEG)-Based Hydrogel" *Biointerphases*, **2016**, 11, 021002. [Citations: 0.](#)
- 96) Z Qiang, C Ye, K Lin, ML Becker, KA Cavicchi, BD Vogt* "Evolution in surface morphology during rapid microwave annealing of PS-*b*-PMMA thin films" *J Polym Sci B: Polym Phys*, **2016**, 54, 1499–1506. [Citations: 2.](#) DOI: 10.1002/polb.24043
- 95) ZK Zander, F Wang, ML Becker*, RA Weiss* "Ionomers for Tunable Softening of Thermoplastic Polyurethane" *Macromolecules* **2016**, 49(3), 926–934. [Citations: 0.](#)
- 94) Y Ma[^], GM Policastro[^], Q Li, J Zheng, R Jaquet, WJ Landis, ML Becker* "Concentration Dependent Differentiation of hMSC on orthogonal gradients of BMP-2 and GRGDS peptides" *Biomacromolecules*, **2016**, 17, 1486–1495. DOI: 10.1021/acs.biomac.6b00088. [Citations: 1.](#) (^co-first authors)
- 93) Y Lu, CM Doulder, J Walker, R Mischra, D Dean, ML Becker* "Oligomeric Poly(propylene fumarate) via Ring Opening Polymerization as Precursors for cDLP 3D printing" *Biomacromolecules* **2016**, 17(2), 690–697. [Citations: 4.](#)
- 92) GM Policastro, ML Becker* "Osteogenic Growth Peptide and its Use as a Bio-conjugate in Regenerative Medicine Applications" *WIRE Nanomedicine and Nanobiotechnology* **2016**, 8(3), 449–464. DOI: 10.1002/wnan.1376 [Citations: 2.](#)
- 91) Z Zander, G Hua, C Weiner, BD Vogt, ML Becker* "Control of Mesh Size and Modulus by Kinetically Dependent Cross-Linking in Hydrogels" *Advanced Materials*, **2015**, 27 (40), 6283-6288. [Citations: 7.](#)
- 90) Y Gao, EP Childers, ML Becker* L-Leucine-based Poly(ester urea)s for Vascular Tissue Engineering" *ACS Biomaterials Science and Engineering*, **2015**, 1 (9), 795-804. [Citations: 3.](#)
- 89) K Liu, Y-M Chen, GM Policastro, ML Becker, Y Zhu* "Three-dimensional Bi-continuous Graphene Monolith from Polymer Templates" *ACS Nano* **2015**, 9(6), 6041–6049. [Citations: 9.](#)
- 88) J Yu, F Lin, ML Becker* Branched Amino Acid Based Poly(ester urea)s with Tunable Thermal and Water Uptake Properties" *Macromolecules* **2015**, 48(9), 2916–2924. [Citations: 4.](#)
- 87) GM Policastro, F Lin, LA Smith Callahan, A Esterle, M Graham, KS Stakleff, ML Becker* "OGP Functionalized Phenylalanine-based Poly(ester urea) for Enhancing Osteoinductive Potential of human Mesenchymal Stem Cells" *Biomacromolecules* **2015**, 16(4), 1358-1371. [Citations: 13.](#)
- 86) J Zhou, K Mischra, V Bhagat, A Joy, ML Becker* "Thermoresponsive Dual Emission Nanosensor Based on Quantum Dots and Dye Labelled Poly(N-isopropylacrylamide)" *Polymer Chemistry*, **2015**, 6, 2813 – 2816. [Citations: 3.](#)
- 85) Y Zhang, SM Bhaway, Y Wang, KA Cavicchi, ML Becker, BD Vogt* "Rapid (< 3 min) Microwave Synthesis of Block Copolymer Templated Ordered Mesoporous Metal Oxide and Carbonate Films using Nitrate-Citric Acid Systems" *Chemical Communications* **2015**, 51, 4997 – 5000. [Citations: 5.](#)
- 84) S Li, J Yu, MB Wade, GM Policastro, ML Becker* "Radiopaque, Iodine Functionalized Poly(ester urea)s" *Biomacromolecules* **2015**, 16(2), 615–624. [Citations: 7.](#)
- 83) J Zheng, G Hua, F Lin, J Yu, MB Wade, DH Reneker, ML Becker* "Post-electrospinning "Tri-Click" Functionalization of Degradable Polymer Nanofibers" *ACS Macro Letters* **2015**, 4, 207-213. [Citations: 8.](#)

- 82) AP Defante, T Barai, ML Becker, A Dhinojwala* "The Consequences of Water Between Two Hydrophobic Surfaces on Adhesion and Wetting" *Langmuir*, **2015**, 31(8), 2398–2406. [Citations: 9.](#)
- 81) EP Childers, M Wang, JP Fisher, ML Becker, D Dean* "3D Printing of Resorbable Poly(propylene fumarate) Tissue Engineering Scaffolds" *MRS Bulletin* **2015**, 40(2), 1119-1126. [Citations: 16.](#)
- 80) J Zheng, D Kontoveros, F Lin, G Hua, DH Reneker, ML Becker*, RA Willits*, "Enhanced Schwann Cell Attachment and Alignment Using One-Pot "Dual-Click" GRGDS and YIGSR Derivatized Nanofibers" *Biomacromolecules*, **2015**, 16(1), 357-363. [Citations: 6.](#)
- 79) J Zhou, AP Defante, F Lin, Y Xu, J Yu, Y Gao, EP Childers, A Dhinojwala, ML Becker* "Adhesion Properties of Catechol-based Biodegradable Amino Acid-Based Poly(ester urea) Copolymers Inspired from Mussel Proteins" *Biomacromolecules* **2015**, 16(1), 266-274. [Citations: 11.](#)
- 78) M Castano, KS Seo, K Guo, ML Becker, C Wesdemiotis, JE Puskas "Green polymer chemistry: synthesis of symmetric and asymmetric telechelic ethylene glycol oligomers" *Polymer Chemistry* **2015**, 6, 1137-1142. [Citations: 1.](#)
- 77) W Tang, GM Policastro, G Hua, K Guo, J Zhou, C Wesdemiotis, GL Doll, ML Becker* Bioactive OGP-functionalized catechol dendrons with strong binding affinity to oxide surfaces. *J. Amer. Chem. Soc.* **2014**, 136, 16357-16367. [Citations: 19.](#)
- 76) J Zheng, Y Chen, A Karim, ML Becker* "Dopamine based copper-free click kit for efficient surface functionalization" *ACS Macro Letters* **2014**, 3(10), 1084-1087. [Citations: 2.](#)
- 75) W Tang, ML Becker* "Click" Reactions: a Versatile Toolbox for the Synthesis of Peptide Conjugates. *Chem. Soc. Rev.* **2014** 43(20), 7013-7039. [Citations: 86.](#)
- 74) M Castano, ML Becker, JE Puskas "New Method for the Synthesis of Fully Aliphatic Telechelic α,ω -Dihydroxy-Polyisobutylene" *Polymer Chemistry* **2014**, 5(18), 5436-5442. [Citations: 6.](#)
- 73) M Castano, J Zheng, JE Puskas*, ML Becker* "Enzyme-Catalyzed Ring-Opening Polymerization of ϵ -caprolactone using Alkyne Functionalized Initiators" *Polymer Chemistry* **2014**, 5(6), 1891-1896. [Citations: 7.](#)
- 72) J Yu, F Lin, P Lin, Y Gao, ML Becker* "Phenylalanine-based Poly(ester urea): Synthesis, Characterization and *in vitro* Degradation" *Macromolecules* **2014**, 47(1),121-129. [Citations: 20.](#)
- 71) KS Seo, YM Castano, M Casiano, C Wesdemiotis, ML Becker, JE Puskas* "Functionalization of Poly(ethylene glycol)s by Enzyme-catalyzed Transesterification of Divinyl Adipate under Solventless Conditions" *RSC Advances*, **2014**, 4(4), 1683-1688. [Citations: 3.](#)
- 70) F Lin, J Yu, W Tang J Zheng, S Xie, ML Becker* "Postelectrospinning "Click" Modification of Degradable Amino acid-based Poly(ester urea) Nanofibers" *Macromolecules* **2013**, 46(24), 9515-9525. [Citations: 19.](#)
- 69) Y Li, Z Wang, J Zheng, H Su, F Lin, K Guo, X Feng, C Wesdemiotis, ML Becker, SZD Cheng, WB Zhang "Cascading One-Pot Synthesis of Single-tailed and Asymmetric Multi-tailed Giant Surfactants" *ACS Macro Letters*, **2013** 2(11), 1026-1032. [Citations: 21.](#)
- 68) X Liu, J Zhou, J Zheng, ML Becker* X Gong* "Water-soluble CdTe quantum dots as an anode interlayer for solution-processed near infrared polymer photodetectors" *Nanoscale* **2013**, 5(24), 12474-79. [Citations: 7.](#)
- 67) F Lin, J Yu, W Tang, J Zheng, A Defante, K Guo, C Wesdemiotis, ML Becker* "Peptide Functionalized Oxime Hydrogels with Tunable Mechanical Properties and Gelation Behavior" *Biomacromolecules* **2013**, 34, 9089-9095. [Citations: 37.](#)
- 66) LA Smith Callahan, S Xie, I Barker, J Zheng, DH Reneker, AP Dove, ML Becker* "Accelerated Differentiation and Neurite Extension of mESC on Aligned Poly(lactide) Nanofibers Functionalized with YIGSR" *Biomaterials*, **2013**, 34, 9089-9095. [Citations: 45.](#)
- 65) W Tang, Y Ma, S Xie, K Guo, B Katzenmeyer, C Wesdemiotis, ML Becker* "Valency Dependent Affinity of Hydroxyapatite-binding Dendrimers", *Biomacromolecules*, **2013**, 14, 3304-3313. [Citations: 11.](#)
- 64) LA Smith-Callahan, GM Policastro, SL Bernard[†], EP Childers, R Boechtter[†], ML Becker* "Influence of Discrete and Continuous Culture Conditions on Human Mesenchymal Stem Cell Lineage Choice in RGD Concentration Gradient Hydrogels. *Biomacromolecules*, **2013**, 14, 3047-3054. [Citations: 10.](#)

- 63) M Castano, KS Seo, EH Kim[†], ML Becker, JE Puskas* “Synthesis of Halo-ester Functionalized Poly(ethylene glycol)s via Enzymatic Catalysis” *Macromolecular Rapid Communications*, **2013**, 34, 1375-1380. [Citations: 8.](#)
- 62) H Su, J Zheng, Z Wang, F Lin, X Feng, X-H Dong, ML Becker, SZD Cheng, W-B Zhang, Y Li “Sequential Triple “Click” Approach toward Polyhedral Oligomeric Silsesquioxane-Based Multi-Headed and Multi-Tailed Giant Surfactants” *ACS Macro Letters*, **2013**, 2, 645-650. [Citations: 31.](#)
- 61) T Rao, G Singh, S Xie, A Karim*, ML Becker* “2D Au Nanoparticle Arrays using Thermally Directed Assembly of Peptide-Derivatized Block Copolymers” *Soft Matter*, **2013**, 9, 8023-8032. [Citations: 2.](#)
- 60) F Lin, J Zheng, J Yu, J Zhou, ML Becker* “Cascading “Tri-Click” Functionalization of Polycaprolactone Thin Films Quantified via QCM”, *Biomacromolecules*, **2013**, 14, 2857-2865. [Citations: 14.](#)
- 59) D Bandyopadhyay, G Singh, ML Becker, A Karim “Capillary Wave Confinement Induced Stabilization of Polymer Films” *ACS Applied Materials & Interfaces*, **2013**, 5(10), 4006-4010. [Citations: 4.](#)
- 58) LA Smith-Callahan, EP Childers, AM Ganos[†], R Boechter[†], SD Weiner, ML Becker* “Maximizing phenotype constraint and extracellular matrix production in primary human chondrocytes using arginine–glycine–aspartate concentration gradient hydrogels. *Acta Biomaterialia*, **2013**, 9(7), 7420-7428. [Citations: 25.](#)
- 57) J Zhou, S Xie, EF Amond[†], ML Becker* “Tuning Energy Levels of Low Bandgap Semi-Random Two Acceptor Copolymers” *Macromolecules*, **2013**, 46(9), 3391-3394. [Citations: 38.](#)
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- 3) MJ Joralemon, KS Murthy, EE Remsen, ML Becker, KL Wooley, "Synthesis, Characterization, and Bioactivity of Mannosylated Shell Crosslinked Nanoparticles." *Biomacromolecules*, **2004**, 5, 903-913. [Citations: 122](#)
- 2) ML Becker, J Liu, KL Wooley, "Peptide-polymer Bio-conjugates: Hybrid block copolymers generated via living radical polymerizations from resin supported peptides." *Chem Comm*, **2003**, 2, 180-181. [Citations: 117](#)
Highlighted in Chemical & Engineering News, 81(6), February 10, 2003. "Nanoscale control of Bioconjugates" by Michael Freemantle
- 1) ML Becker, EE Remsen, KL Wooley, "Diblock Copolymers, Micelles, and Shell Crosslinked Nanoparticles Containing Poly(4-Fluorostyrene): Tools for detailed analysis of nanostructured materials." *J. Polym. Sci. Part A: Polym. Chem.* **2001**, 39(23), 4152-4166. – featured on journal cover. [Citations: 81](#)

NATIONAL & INTERNATIONAL SYMPOSIA ORGANIZED

- Chair, Polymers Gordon Conference, Holyoke, MA, June 2017
- Vice-Chair, Polymers Gordon Conference, Holyoke, MA, June 2015
- Organizer, Symposia for ACS National Meeting, Denver, CO, April 2015, "PMSE Young Investigators Symposium" w/ *Andy Tsou, Exxon Mobil & Christopher Stafford, NIST*
- Organizer, Symposia for ACS National Meeting, Dallas, TX, April 2014, "PMSE Young Investigators Symposium" w/ *Al Nelson, IBM & Christopher Stafford, NIST*
- Organizer, Symposia for ACS National Meeting, Indianapolis, IN, September 2013, "Excellence in Graduate Student Research" w/ *Al Nelson, IBM & Christopher Stafford, NIST*
- Organizer, Symposia for ACS National Meeting, New Orleans, LA, April 2013, "Excellence in Graduate Student Research" w/ *Al Nelson, IBM & Christopher Stafford, NIST*
- Organizer, Symposia for Materials Research Society, Boston MA, November 2012, "Biomimetic Materials" w/ *Nicole Moore, NCI*
- Organizer, Symposia for ACS National Meeting, Philadelphia, PA, August 2012, "Tethered Growth Factor Gradients" w/ *Jason Burdick, UPenn & William Murphy, Wisconsin*
- Organizer, Symposia for ACS National Meeting, Philadelphia, PA, August 2012, "Young Investigators Symposium" w/ *Al Nelson, IBM & Christopher Stafford, NIST*
- Organizer, Symposia for World Biomaterials Congress, Beijing China, June 2012, "Gradients in Biomedical Engineering" w/ *J Ding, Fudan University*
- Organizer, Symposia for Biomaterials National Meeting, San Antonio, TX, April 2009, "Clinical Applications in Nanomedicine"
- Organizer, Symposia for Biomaterials National Meeting, San Antonio, TX, April 2009, "Peptide Functionalized Materials for Directing Cell Response" w/ *Nathan Gallant – Univ of South Florida*
- Co-organizer, ACS National Meeting, Boston, MA, August 2007, PMSE Section, "Beyond Biocompatibility: Characterization of Functional Materials." w/ *Sheng Lin-Gibson - NIST*
- Co-organizer, Society for Biomaterials National Meeting, Chicago, IL, April 2007, "Cell Function on Biomaterial Gradients and Arrays." w/ *Carl G. Simon Jr. – NIST & Deborah Leckband – U of Illinois*

TEACHING EXPERIENCE

University of Akron

Fall 2016 Polymeric Biomaterials (22 Students)
Fall 2015 Polymeric Biomaterials (6 Students)
Fall 2014 Advanced Biomaterials – Department of Biomedical Engineering (33 Students)
Spring 2014 Polymeric Biomaterials (22 Students)
Fall 2013 BioDesign (8 Students)
Formal Seminar I - II (53 Students)
Fall 2012 BioDesign (12 Students)
Formal Seminar I - II (48 Students)
Spring 2012 Polymeric Biomaterials (19 Students)
Fall 2011 Formal Seminar I - II (72 Students)
Spring 2011 Polymeric Biomaterials – Special Topics (15 Students)
Fall 2010 Formal Seminar I - II (51 Students)
Polymer Concepts (33 students, Co-w/ C Pugh)
Spring 2010 Polymeric Biomaterials – Special Topics (11 Students)
Fall 2009 Formal Seminar I - II (38 Students)
Polymer Characterization (38 students, Co-w/ G Carri & M Foster)
Polymer Concepts (20 students, Co-w/ C Pugh & R Quirk)

Washington University

Fall 2001 Chemistry Outreach for K-8 Teachers
Spring 2000 Organic Chemistry II Lecture TA (350 Students)
Fall 1999 General Chemistry Recitation Leader (3 * 40 Students)
Spring 1999 Sophomore Organic Chemistry Laboratory TA (16 Students)
Fall 1998 Advanced Organic Chemistry Laboratory TA (20 Students)
1996-1998 Organic Chemistry Laboratory TA (20 Students)

STUDENT AWARDS

ACS Eastman Chemical Company Excellence in Graduate Research Award - Akron
Zachary Zander (2015)

ACS Eastman Chemical Company Excellence in Graduate Research Symposium
Jukuan Zheng (2015)

Ohio Rubber Group Student Award

Marcela Castano (2011)
Elena Silantyeva (2014)

NSF Graduate Research Fellowship

Erin P. Childers (2012)

USA Brazil Fullbright Fellowship

Cecilia Motta (2014)

Richard L Waldman Jr. Scholarship

Gabrielle Siefert (2013)

Outstanding Undergraduate Researcher – The University of Akron

Sharon Bernard (2013)

Ron Eby Award for Outstanding First year Graduate Student

Wen Tang (2010)
Zach Zander (2014)

CURRENT GROUP

Yanyi Xu, Ph.D. (2016 – present) – The Ohio State University, J Guan, advisor
James Wilson, Ph.D. (2015 – present) – University of Warwick, AP Dove, advisor.

Greg Peterson, Ph.D. (2015 – present) – University of Washington, AJ Boydston, advisor.

Alexandra Abel (2016 – present) – BS, Grove City College
Garrett Bass (2015 – present) – BS, California Polytechnic SLO
Jason Nettleton (2015 – present) – BS, The University of San Diego
Nathan Dredger (2015 – present) – BS, Mount Union University
Shannon Peterson (2015 – present) – BS, Allegheny College
Derek Luong (2014 – present) – BS, MS, Clark University
Rodger Dilla (2014 – present) – BS, The University of Pittsburgh
Alex Kleinfehn (2014 – present) – BS, The University of Minnesota, Morris
Zachary Zander (2013 – present) – BS, St. Norbert College
Elena Silantyeva (2013 – present) – BS, Moscow State University
Yuan Yuan Luo (2013 – present) – BS, Beijing University of Chemical Technology
Shan Li (2012 – present) – BS, Sichuan University
Vrushali Bhagat (2012 – present) – BS, UCT Mumbai
Jiayi Yu (2011 – present) – BS, Beijing University of Chemical Technology

MS Students

Hao Li (2015 – present) – BS, Donghua University
Peiru Chen (2016 – present) – BS, Beijing University of Chemical Technology
Yusheng Chen (2016 – present) – BS, Beijing University of Chemical Technology

GRADUATE STUDENTS MENTORED

PhD Students

Erin P Childers (2011 – 2016) – BS, Ursilin College, then postdoctoral scholar, Arizona State University
Mary Beth Wade (2011 – 2016) – BS, The University of Akron, then Research Fellow, The Ohio State University
Yaohua Gao (2011 – 2016) – BS, Nankai University, then Senior Scientist, Exxon Mobil
Gina M Policastro (2011 – 2016) – BS, Washington and Jefferson University, then postdoctoral fellow UCSD – Nathan Gianneschi & Karen Christman
Adrian Defante (2010 – 2016) – BS, University of Cincinnati (w/ A Dhinojwala), Then NRC Postdoctoral Fellow, NIST
Jinjun Zhou (2010 – 2015) – BS, Nanjing University, Then Assistant Professor of Analytical Chemistry, Nanjing Technical University, China
Jukuan Zheng (2010 – 2015) – BS, Peking University, Then Postdoctoral Fellow w/ Theresa Rieneke at The University of Minnesota
Wen Tang (2009 – 2014) – BS, Peking University, Then Postdoctoral Fellow w/ Robert Langer at Massachusetts Institute of Technology
Yanrui Ma (2009 – 2014) – BS, University of Science and Technology of China, Now Postdoctoral Scientist Oak Ridge National Laboratory
Marcela Castano (2009 – 2014) – BS, Antioqua Univ. - Columbia (w/ J Puskas), Now Research Scientist, Avery Dennison
Fei Lin (2009 – 2014) – BS, Nankai University, Now Research Scientist, PolyOne
Tingling Rao (2010 – 2013) – BS, USTC, Now Research Scientist, Intel
Jing Yu (2009 – 2012) – BS, USTC (w/ G Carri), Then Postdoctoral Fellow, University of Oklahoma

MS Students

Ronghui Hui (2014 – 2016) – BS, Donghua University, Then PhD Student, Queens College
Cecilla Motta (2014 – 2016) – BS, University of San Paulo, Then PhD Student, at UA

Gabrielle Sieffert	(2014 – 2016) – BS, The University of Akron, Then Dental School The Ohio State University
Huifeng Wang	(2013 – 2015) – BS, East China University of Science and Technology, MS 2015, Then PhD student – University of Akron Chemical Engineering
Qiyu Yu	(2013 – 2015) – BS, Beijing University of Science and Technology, MS 2015, Then PhD student – Penn State Bioengineering
Geng Hua	(2012 – 2014) – BS, Beijing University of Chemical Technology, MS 2014, Now PhD Student, KTH, Stockholm Sweden
Sibai Xie	(2011 – 2013) – BS, Soochow University, MS 2013, Now PhD student, University of California, San Diego
Tianyi Yu	(2011 – 2013) – BS, ECUST, MS 2013, Then PhD student, Louisiana State University

POSTDOCS MENTORED

Alumni

Siamak Al Salem, Ph.D.	(2015 – 2016) – University of Akron, RA Weiss, advisor. Then Scientist Purdue University, Department of Materials Engineering.
Laura A. Smith, Ph.D.	(9/09 – 3/2013) – U of Michigan, PX Ma, advisor. Then Assistant Professor, University of Texas Houston Medical Center, Dept of Neurosurgery
Khaled A. Aamar, Ph.D.	(12/06 – 9/2010) - U of Massachusetts – Amherst, Greg Tew, advisor - NIST-RESBIO Fellow – Then, Senior Scientist, The Pall Corporation
Sapun Parekh, Ph.D.	(8/08 – 9/2010) - UC Berkley, Daniel Fletcher, advisor - NIST-NRC Fellow – then National Academy of Sciences Policy Fellow, Then Alexander Von Humboldt Fellow, Max Plank Institute for Polymer Research
Nicole M. Moore, Ph.D.	(7/08 – 9/2010) - Washington Univ, Shelly Sakiyama-Elbert, advisor - NIST-NRC Fellow, then Program Manager, National Cancer Institute, now Asst Vice President of Research, Northwestern University
Michael C. Weiger, Ph.D.	(7/08 – 9/2010) - NC State Univ, Jason Haugh, advisor - NIST-NRC Fellow - then NIH Fellow
Jung Jin Park, Ph.D.	(6/08 – 6/09) - University of Maryland, Guest Researcher – Now – Research Scientist, University of Maryland
Abby Whittington, Ph.D.	(11/06 -2/08) - U of Illinois, Russell Jamison, advisor - NIST-NRC Fellow - Now Associate Professor, Virginia Tech, Dept of Material Science and Engineering & Dept of Chemical Engineering
Marc D. Roy, Ph.D.	(7/06 -5/08) - Boston College, Shana O. Kelly, advisor - NIST-NRC Fellow – Now Senior Research Scientist, Pfizer
Silvia H. Lacerda, Ph.D.	(3/06 -2/09) - U of San Paulo, Brazil, Frank Quina, advisor - Guest Researcher – Then ORISE Fellow, US Food and Drug Administration – Now Permanent Scientific Staff, US FDA – CEDR Division.
Nathan D. Gallant, Ph.D.	(2/05 -7/08) - Georgia Tech, Andres Garcia, advisor - NIST-NRC Fellow – Now Associate Professor, Univ of South Florida, Dept of Mechanical Engineering

UNDERGRADUATES MENTORED

University of Akron

10/2016 – present	Kourtney (Chemical Engineering)
5/2016 – present	Laura Savariau (Biology)
9/2015 – present	Neil Bernard (Biology)
1/2015 – present	Emily O'Brien (Biomedical Engineering)
9/2015 – 5/2016	Lauren Breitenstein (Biomedical Engineering)
1/2015 – 5/2016	Bryan Fitch (Chemistry), then PhD Program Chemistry, The Ohio State University
1/2015 – 5/2015	Katie DeLozier (Biomedical Engineering), Then MD student NEOMED

1/2013 – 5/2015 Alex Ellenberger (Honors Biochemistry), Then MD student Toledo
 8/2012 – 5/2014 Gabrielle Siefert (Honors Chemistry), Then Dental School, CWRU
 1/2012 – 5/2014 Sharon Bernard (Honors Biology), Then MD student NEOMED
 5/2012 – 5/2013 Erin Keane (Chemistry), Then chemist, A Schulman
 9/2009 – 6/2011 Anna Gaios (BS 2011, Honors Biochemistry), Then, PhD candidate, U of Michigan
 6/2009 – 4/2011 Louis Britton (BS 2011, Honors Chemistry) – Then, small business owner
 3/2010 – 9/2010 Jimmy Miller (Honors Biology)

University of Akron – NSF Research Experience for Undergraduate REU Students

Summer 2016 Caroline Watt (Chemistry) – Ohio State University
 Summer 2016 Olivia Manahan (Chemistry) – Ball State University
 Summer 2016 Lindsay Lee Robinson (Chemistry) - College of Wooster
 Summer 2015 Jacob Schimelman (BME) – Case Western Reserve University
 Summer 2015 Erin O'Brien (BME) – The University of Akron
 Summer 2014 Justin Harris (Chemistry) – Michigan State University, now PhD student, Michigan
 Summer 2013 Redwanna Tassebaum – Robert Morris University, now MD student
 Summer 2012 Emily Amond (Chemistry) – St. Vincent College, now P&G chemist
 Summer 2011 Ronna Boettcher (Chemistry and Biology) – Bemiji State University, now 3M engineer
 Summer 2010 Mina Chen (Chemical Engineering) – University of Minnesota, now PhD student UPenn
 Summer 2010 James Burrows (Chemistry) – University of Pittsburgh

NIST

6/2008-9/2008 Bethany Juhnke (Mechanical Engineering)- Undergraduate SURF – Iowa State University, Then, MS, Iowa State University, Dept of Mechanical Engineering, PhD University of Minnesota Mechanical Engineering
 6/2008-9/2008 Joseph C. Sabol (Chemistry)- Undergraduate SURF – Lehigh University
 Then, PhD student, Lehigh University, Dept of Material Science
 2006-07 Summers Adrienne H. Smith (Biomedical Engineering)- Undergraduate SURF – Northwestern Then, MD-PhD student, Northwestern Univ School of Medicine, HMMI fellow 2011
 6/2006-9/2006 Kristen E. Roskov (Chemical Engineering)- Undergraduate, University of Maryland Then, NSF Graduate Research Fellow, NC State, Dept. of Chemical Engineering

PRESENTATIONS

2017

Department of Chemistry Seminar, Carnegie Mellon University, January 17, 2017, Additive manufacturing of peptide functionalized tissue engineering scaffolds" (*invited*)
 ACS National Meeting, San Francisco, CA - April 6, 2017 "Shape Prophecy: Active shape changing" (*invited*)

2016

Boston Scientific Research January 12, 2016 "Innovation in the Biomaterials Space" (*invited*)
 Department of Macromolecular Science and Engineering Seminar, January 29, 2016 Case Western Reserve University "Amino Acid-based Polymers for Regenerative Medicine" (*invited*)
 Department of Chemistry Seminar, February 25, 2016 University of North Carolina "Amino Acid-based Polymers for Regenerative Medicine" (*invited*)
 ACS National Meeting, March 26, 2016 "Additive manufacturing of peptide functionalized tissue engineering scaffolds" (*invited*)
 ACS National Meeting, March 27, 2016 "Functional Hydrogel Scaffolds" (*invited*)

Department of Chemistry Seminar, Kenyon College, April 5, 2016 “Additive manufacturing of peptide functionalized tissue engineering scaffolds” (*invited*)

Department of Chemistry Seminar, Penn State University, April 18th, 2016 “Amino Acid-based Polymers for Regenerative Medicine” (*invited*)

ACS Central Regional Meeting, Covington Kentucky, May 18, 2016 “Bioinspired Systems for Regenerative Medicine” (*invited plenary*)

Macro 2016, Warwick, UK, July 18, 2016 “Soft tissue repair using polymer functionalized decellularized tissue” (*invited*)

MTAC, Taipei, Taiwan July 26, 2016 “Tomorrow’s problems will not be solved by yesterdays materials – How additive manufacturing is changing medicine” (*invited plenary*)

ACS National Meeting, Philadelphia, PA August 26, 2016 “Degradable Poly(ester urea)s for Regenerative Medicine” (*invited*)

ACS National Meeting, Philadelphia, PA August 26, 2016 “Photochemical Printing of Bioactive 3D Tissue Engineering Scaffolds” (*invited*).

PC2016, Changchun, China, September 10, 2016 “Photochemical Printing of Bioactive 3D Tissue Engineering Scaffolds” (*invited*).

Heal Ohio Conference, Columbus, Ohio, October 28, 2016, “Tomorrow’s problems will not be solved by yesterdays materials – How additive manufacturing is changing medicine” (*invited*).

Distinctive Voices - National Academy of Sciences - Irvine, November 3, 2016 “Tomorrow’s problems will not be solved by yesterdays materials – How additive manufacturing is changing medicine”. (*Plenary*)

Kavli Frontiers of Science Symposia – “3D printing in the medical space” Irvine, CA November 5, 2016 (*invited*).

Department of Chemistry and Materials Science Seminar, University of Illinois, November 14, 2016, “Tomorrow’s problems will not be solved by yesterdays materials – How additive manufacturing is changing medicine” (*invited*).

2015 (19)

Macromolecular Gordon Research Conference, Ventura, CA January 10, 2015 “Building polymeric blood vessels de novo: Can it really be done?” (*invited*)

Department of Chemistry Seminar, University of California San Diego, February 2, 2015 “Regioselective Functionalization of Polymers with Peptides and Growth Factors for Regenerative Medicine” (*invited*)

Department of Bioengineering Seminar, University of California San Diego, February 3, 2015 “Functionalization of Polymer Constructs with Growth Factor Peptides for Regenerative Medicine” (*invited*)

Department of Polymer Science and Engineering Seminar, University of Massachusetts Amherst, February 5, 2015 “Amino Acid-based Polymers for Regenerative Medicine” (*invited*)

Department of Chemistry Seminar, University of Washington, February 19, 2015 “Amino Acid-based Polymers for Regenerative Medicine” (*invited*)

Adhesion Society National Meeting, Savannah, GA February 23, 2015 “Bioinspired Adhesives for Regenerative Medicine” (*invited*)

Department of Chemistry Seminar, Case Western Reserve University, March 5, 2015 “Translationally relevant strategies for functionalizing biomaterials” (*invited*)

ACS National Meeting, March 22, 2015 “Kinetic control of modulus properties in peptide functionalized hydrogels” (*invited*)

ACS National Meeting, March 23, 2015 “Stabilization and delivery of human growth hormone from polymer nanofibers” (*invited*)

ACS National Meeting, March 26, 2015 “OGP functionalized phenylalanine-based poly(ester urea) for enhancing osteoinductive potential of human mesenchymal stem cells” (*invited*)

Slovenian Polymer Workshop Gradzic Slovenia, April 14, 2015 “Building Bone w/ Polymers: An Unconventional Approach” (*invited*)

Slovenian Biomaterials Society Gradzic Slovenia, April 15, 2015 “Post-fabrication functionalization of Polymer Nanofibers” (*Plenary Lecture*)

Fusion Functional Polymeric Materials Conference, Ascot, UK, August 7, 2015 "Polymers for Regenerative Medicine" (*invited*)

ACS National Meeting, August 2015, Biomacromolecules/ Macromolecules Young Investigator Award Symposium "Translationally Relevant Strategies for Functionalizing Biomaterials" (*Invited Award Address*)

Polymers in Medicine and Biology, Santa Rosa, CA, September 17, 2015 "Tissue Engineered Vascular Grafts" (*invited*)

Massachusetts Institute of Technology Polymer Science Seminar Series, Boston, MA October 14, 2015 "Polymer Approached to Regenerative Medicine" (*invited*)

62nd AVS International Symposium, San Jose, CA, October 20, 2015 "Accelerated Differentiation of hMSC on substrates possessing orthogonal peptide concentrations of BMP-2 peptide and GRGDS" (*invited*).

Houston Methodist Research Institute, Oct. 26, 2015, Houston TX "Building Shells for use in humans – what is really involved" (*invited*)

12th New Jersey Symposium on Biomaterial Science, Nov. 9, 2015, New Brunswick, NJ, "Kinetically controlled Mechanical Properties of Polymer Hydrogels." (*invited*)

2014

Department of Chemistry Seminar, Northeastern University, January 19, 2014 "Peptide Functionalized Materials for Regenerative Medicine" (*invited*)

Department of Biomedical Engineering Seminar, Texas A&M University, February 19, 2014 "Building bone with polymers: An unconventional approach" (*invited*)

Plenary Lecture, Waterborne Symposia, New Orleans, LA Feb 26th, 2014 Building bone with polymers: An unconventional approach" (*Plenary Lecture*)

ACS National Meeting, March, 2014, Dallas, TX "Building bone with polymers: An unconventional approach" ACS Award in Polymer Chemistry Symposium for Karen Wooley (*invited*)

ACS National Meeting, March, 2014, Dallas, TX "Directed differentiation and neurite extension of mouse embryonic stem cell on aligned poly(lactide) nanofibers functionalized with YIGSR peptide" (*invited*)

ACS National Meeting, March, 2014, Dallas, TX "Peptide Functionalized Nanofibers for Regenerative Medicine" (*invited*)

Department of Chemistry Seminar, Youngstown State University, March 28th, 2014 "Building Bone with Polymers" (*invited*)

Department of Chemical And Biological Engineering, Drexel University, April 4th 2013 "Functionalization of Polymer Constructs with Growth Factor Peptides for Regenerative Medicine" (*invited*)

Plastics In Medical Devices 2014, May 7th, 2014 "Choosing the right materials & Innovations on the horizon" (*Plenary*)

Innovation Symposium, The University of Michigan, May 14th 2014 "Building an innovation culture using open innovation" (*Plenary*)

Cook Medical Industrial Seminar, Bloomington, IN May 15th, 2014 " Building Blood Vessels with Polymers" (*Invited*)

South China University of Science and Technology June 3rd, 2014 "Peptide Functionalized Nanofibers for Regenerative Medicine" (*invited*)

PC2014, Shanghai, China "Building Bone with Polymers: an Unconventional Approach" June 7th, 2014 (*invited*)

University of Warwick, Department of Chemistry Seminar August 18, 2014, "Peptide Functionalized Nanofibers for Regenerative Medicine" (*invited*)

University Hospitals Warwick UK August 19, 2014, "Building Bone with Polymers" (*invited*)

Department of Chemistry Seminar, Cornell University, October 27, 2014 "Functionalization of Polymer Constructs with Growth Factor Peptides for Regenerative Medicine" (*invited*)

Department of Chemistry Seminar, Ithaca College, October 28, 2014 "Functionalization of Polymer Constructs with Growth Factor Peptides for Regenerative Medicine" (*invited*)

2013

T2C Regenerative Medicine Wound Care Conference, Center for Regenerative Medicine, Ohio State University, Columbus, OH March 16th 2013, "Bioactive, Degradable Polymers of Orthopedics: More Problems or New Paradigm" (*invited*)
ASPM, Bled, Slovenia April 4, 2013, "Functionalization of Polymer Constructs with Growth Factor Peptides for Regenerative Medicine: Gels, Fibers & Scaffolds" (*invited*)
3M Global Headquarters, May 21st, 2013 "Innovations in Biomaterials" (*invited*)
Polymers Gordon Conference, Holyoke, MA June 10th 2013, "Functionalization of Polymer Constructs with Growth Factor Peptides for Regenerative Medicine: Gels, Fibers & Scaffolds" (*invited*)
SOLAR Inspire Solvay Lecture, New York, NY, July 12th 2013 "Translationally relevant materials for tissue engineering" (*Plenary - Invited*)
Ohio Tissue Engineering Consortia, Mohican, OH, July 27th 2013 "Regioselective functionalization of Gels, Fibers and Scaffolds"
Macromolecular Complexes IUPACC Meeting, Greenville, SC August 11, 2013, "Regioselective functionalization of Gels, Fibers and Scaffolds" (*Invited, Keynote*)
Materials in Medicine, Ferenza, Italy October 9th 2013, "Translationally relevant approaches to functional polymeric scaffolds" (*Invited, Keynote*)
EPFL Department of Chemistry, Lausanne, Switzerland, October 11th 2013 "Translationally relevant approaches to functional polymeric scaffolds" (*Invited*)
Stimuli Responsive Materials Santa Rosa, CA October 22th 2013, "Translationally relevant approaches to functional polymeric scaffolds" (*invited*)
Department of Materials Science and Engineering, The University of Michigan, November 12th, 2013 "Translationally relevant approaches to functional polymeric scaffolds" (*Invited*)

2012

Department of Chemical and Biological Engineering, Colorado State University, February 24, 2012 "Using Peptides as Molecular Building Blocks for Functional Biomaterials" (*invited*)
The Lubrizol Corporation, March 15th, 2012 "Polymers from Amino Acids" (*Invited*)
The Methodist Hospital Research Institute, March 21, 2012 "Biomaterials for Bone" (*invited*)
Center for Regenerative Medicine, The Ohio State University, April 25th, 2012 "Polymers from Amino Acids" (*Invited*)
Akron Functional Materials Center, April 26th, 2012 "Polymer Building Blocks for Organic Electronics and Photodetectors" (*Invited*)
TEKES Functional Materials Summer Festival 2012, May 29th 2012, Helsinki, Finland "Using Material Gradients to Accelerate the Clinical Translation of Biomaterials" (*invited*)
IUPAC MACRO 2012, Blacksburg, VA June 25th, 2012 "Degradable Amino Acid Polymers for Biological Applications" (*invited*)
Macro 2012, Warwick, UK, July 11, 2012 "Using Peptides as Molecular Building Blocks for Functional Biomaterials"
ACS National Meeting, Young Investigators Symposium, Philadelphia, PA, August 26th, 2012 "Using Peptides as Molecular Building Blocks for Functional Biomaterials" (*invited*)
ACS National Meeting, Philadelphia, PA, August 26th, 2012 "Phenotype restraint of primary human chondrocytes using in hybrid hydrogels" (*invited*)
College of Polymer Science and Polymer Engineering Sponsors Day, October 5, 2012, Akron, OH "Functionalization of Biomaterials using Metal Free Click Chemistry." (*invited*)
Zing Polymer Chemistry Conference 2012, Cancun Mexico, November 18th, 2012 "Using Peptides as Molecular Building Blocks for Functional Biomaterials" (*invited*)
Cook Biotech, Inc. December 10, 2012, Akron, OH "Functionalization of Biomaterials using Metal Free Click Chemistry." (*invited*)

2011

Department of Chemistry, University of Akron, November 18, 2011 "Using Peptides as Molecular Building Blocks for Functional Biomaterials" (*invited*)
Department of Polymeric Materials, Shanghai Jiao Tong University, November 9, 2011, Shanghai, China "Using Peptides as Molecular Building Blocks for Functional Biomaterials" (*invited*)
Department of Polymeric Materials, Soochow University, November 6, 2011, Shuzhou, China "Using Peptides as Molecular Building Blocks for Functional Biomaterials" (*invited*)

College of Polymer Science and Polymer Engineering Sponsors Day, October 6, 2011, Akron, OH
“Using Peptides as Molecular Building Blocks for Functional Biomaterials” *(invited)*

Department of Orthopaedic Surgery, Methodist Hospital Research Institute, August 23, 2011, “New Polymers for Orthopedics: more problems or new paradigm” *(invited)*

Department of Chemical Engineering, Vanderbilt University, May 18th 2011 “Nanotechnology Approaches to Enhancing Biomaterial Function” *(invited)*

Department of Orthopaedic Surgery, Case Western Reserve University, May 5, 2011 “New Polymers for Orthopedics: more problems or new paradigm” *(invited)*

Peking, Kyoto, Akron Trilateral Polymer Symposium Peking University, Beijing, China, May 12th, 2011 “Multivalent Hydroxyapatite-Targeting Ligands: Synthesis and the Relationship between Structure and Binding Affinity” *(invited)*

Beijing University of Chemical Technology, Beijing, China, May 11th, 2011 “Mechanically Enhanced, Peptide Crosslinked Poly(ester urea) for Bone Defect Repair” *(invited)*.

Federation of Asian Polymer Societies Polymer Congress, Beijing, China, May 10th, 2011 “Mechanically Enhanced, Peptide Crosslinked Poly(ester urea) for Bone Defect Repair” *(invited)*

ACS National Meeting, March 27th, 2011, Anaheim, CA “Precise Presentation of Surface-tethered Growth Factors for Directing Cell Function” *(invited)*

ACS National Meeting, March 30th, 2011, Anaheim, CA “Mechanically Enhanced, Peptide Crosslinked Poly(ester urea) for Bone Defect Repair” *(invited)*

Department of Biomedical Engineering Seminar, Ohio State University, Jan 21st 2011, Columbus, OH
“Using Material Gradients to Accelerate the Clinical Translation of Biomaterials” *(invited)*

2010

Akron Functional Materials Center Launch, November 3, 2010, Akron, OH “Accelerating the Clinical Translation of Biomaterials ”

4th International Symposium on Polymer Science, October 29, 2010, Gaithersburg, MD “Non-Traditional Methods for Characterizing Biomaterial Substrates” *(invited)*

Akron Biomaterials Symposium, October 27, 2010 “Automation Challenges to Accelerate Biomaterials Discovery” *(invited)*

Heal Ohio, October 2010, Rootstown, OH “Directing Cell Function Using Peptide Functionalized Materials” *(invited)*

Ohio Nanomedicine Summit, October 18, 2010, Cleveland, OH “Low-Cost, High-Fidelity Imaging Probes for Cancer Detection” *(invited)*

ACS National Meeting, August 2010, Boston, MA “Directing Cell Function Using Peptide Functionalized Materials” *(invited)*

International Forum on Biopolymers, Donghua University June 17, 2010 Shanghai, China “Optimizing Osteogenic Signaling in Human Mesenchymal Stem Cells using Peptide-derivatized Materials” *(invited)*

Department of Polymer Science, Fudan University June 16, 2010 Shanghai, China “Optimizing Osteogenic Signaling in Human Mesenchymal Stem Cells using Peptide-derivatized Materials” *(invited)*

Peking University-ICCAS-Akron Trilateral Polymer Symposium, June 12, 2010 Beijing, China
“Optimizing Osteogenic Signaling in Human Mesenchymal Stem Cells using Peptide-derivatized Materials” *(invited)*

International Symposium on Polymer Physics, June 7, 2010, Ji-Nan, China “Distinct Physico-Chemical Changes Upon Iodine Incorporation in Degradable Amorphous Biomaterials” *(invited)*

International Symposium on Polymer Chemistry, June 3, 2010, Shuzho, China “Optimizing Osteogenic Signaling in Human Mesenchymal Stem Cells using Peptide-derivatized Materials” *(invited)*

Orthopaedic Surgery Rounds, Akron General Medical Center, April 21, 2010 Akron, OH “ Directing Cell Function with Peptide Functionalized Materials” *(invited)*

Bilateral Symposium on Frontiers of Polymers, March 31, 2010, Akron OH, “Optimizing Osteogenic Signaling in Human Mesenchymal Stem Cells using Peptide-derivatized Materials” *(invited)*

2009

Austen Bioinnovation Institute Synergy Seminar, Dec 16, 2009, Akron, OH “Quantitative Bioimaging for Pathology” *(invited)*

Department of Polymer Engineering Seminar, Nov 15, 2009, Akron, OH "Gradient Strategies for Biomaterials Optimization and Directing Cell Function." *(invited)*

College of Polymer Science and Polymer Engineering Sponsors Day, October 1, 2009, Akron, OH "Gradient Strategies for Biomaterials Optimization and Directing Cell Function." *(invited)*

ACS National Meeting, August 2009, Washington DC "DNA-derivatized quantum dots for quantitative biomarker detection." *(invited)*

ACS National Meeting, August 2009, Washington DC "Gradient Strategies for Biomaterials Optimization and Directing Cell Function." *Herman F Mark Scholar Award Symposium in honor of Karen L Wooley (invited)*

SFB National Meeting, April 2009, San Antonio, TX "Aptamer-based Approach to Characterizing Biomaterials and Tissues." *(invited)*

SFB National Meeting, April 2009, San Antonio, TX "Characterizing Biomineral interfaces via Phage-derived Peptides." *(invited)*

ACS National Meeting, March 2009, Salt Lake City, UT "Phage Display in Biomaterial Applications."

ACS National Meeting, March 2009, Salt Lake City, UT "Non-Traditional Methods for Characterizing Biomaterial Substrates." *(invited)*

ACS Delaware Section Meeting, February 24, 2009 "Characterizing Biomaterial Interfaces with Phage-derived Peptides" *(invited)*

DuPont, Central Research and Development, February 24, 2009 "Gradient Strategies for Biomaterials Optimization and Directing Cell Function" *(invited)*

2008

University of Akron, Department of Polymer Science, December 1, 2008 "Characterizing Biomaterial Interfaces via Phage Derived Peptides" *(invited)*

3rd International Symposium on Polymer Science, November 11 2008, Nagoya, Japan "Non-Traditional Methods for Characterizing Biomaterial Substrates" *(invited)*

9th New Jersey Symposium on Biomaterial Science, October 31, 2008, New Brunswick, NJ, "Gradient Methods in Biomaterials Optimization" *(invited)*

Virginia Tech, Department of Chemistry & MURI seminar, October 24, 2008, Blacksburg, VA "Non-Traditional Methods for Characterizing Biomaterial Interfaces" *(invited)*

5th International Conference on Combinatorial and High Throughput Materials Science, September 28, 2008 Seon, Germany "Using 'Combi' to your Advantage in Biomaterials Research" *(invited)*

ACS National Meeting, August 2008, Philadelphia, PA "Length dependent uptake of DNA-wrapped single wall carbon nanotubes"

University of Nebraska, School of Medicine, July 14, 2008, Omaha, NE "Multiplexed Biomarker analysis of Molecular Signatures in Thyroid Cancer" *(invited)*

8th World Biomaterials Congress, June 1, 2008, Amsterdam, NE, "High Specificity Hydroxyapatite Binding Motif Identified via Phage Display"

Armed Forces Institute for Pathology, March 25, 2008, Washington, DC "Aptamer-based Approach to Characterizing Biomaterials." *(invited)*

General Electric, March 24, 2008, Niskayuna, NY "Interaction of Nanomaterials with Biological Systems: The Importance of Careful Characterization." *(invited)*

2007

MRS National Meeting, November 29, 2007, Boston, MA "Addressing Characterization Challenges In Biomaterials Research using Combinatorial Methods" *(invited)*

University of Alabama-Birmingham, School of Medicine, November 5, 2007 "Nano-EHS research thrusts in NISTs Material Science and Engineering Laboratory"

NCMC-12: Data Acquisition, Handling, and Visualization, Nov. 1, 2007, Gaithersburg, MD "Using 'Combi' to your Advantage in Biomaterials Research" *(invited)*

3rd NASA NIST Workshop on Nanotube Measurements, September 28, 2007, Gaithersburg, MD "Carbon Nanotube EHS: Length Dependent Effects on Biological Systems" *(invited)*

University of Massachusetts-Amherst, Chemistry Department Seminar, September 6, 2007. "Combinatorial Methods in Biomaterials: Measurement Challenges at the Cell Material Interface" *(invited)*

ACS National Meeting, August 2007, Boston, MA "Beyond Biocompatibility: Characterization of Functional Materials"
University of Nebraska Medical Center, Endocrinology & Pathology, July 19, 2007, Omaha, NE "Immuno-Fluorescent Staining for Telomerase: Cell Population Expression Variability in Thyroid Cancer." (*invited*)
Gordon Research Conference - Polymers East, June 19, 2007, Holyoke, MA. "Beyond Biocompatibility: Characterization of Functional Materials" (*invited*)
IUPAC and ACS Conference on Macromolecules for a Safe, Sustainable and Healthy World, June 10, 2007, Brooklyn, NY "Combinatorial Methods for Biomaterial Optimization" (*invited*)
ACS National Meeting, March 26, 2007, Chicago, IL "Combinatorial Methods for Tissue Engineering". (*invited*)

2006

8th New Jersey Symposium on Biomaterial Science, Nov. 9, 2006, New Brunswick, NJ, "Combinatorial Methods for Tissue Engineering" (*invited*)
ACS National Meeting, Sept. 9, 2006, San Francisco, CA, "Reducing the Complexity of Analyzing Cell-Material Interactions using Combinatorial Fabrication Methods"
Methods in Bioengineering – P41 Symposium, July 17, 2006, Cambridge, MA, "Reducing the Complexity of Analyzing Cell-Material Interactions using Combinatorial Fabrication Methods" (*invited*)
New York Academy of Sciences - Frontiers of Science Program, April 4, 2006, New York, NY "Measurement Challenges at the Cell-material Interface: Differentiating at the Nanoscale" (*invited*)

2005

NIST-NIMS International Combinatorial Nanomaterials Symposium, Dec. 5, 2005, Washington DC "Fabrication of a Universal Substrate for Biofunctionalization" (*invited*)
ACS National Meeting, Sept. 1, 2005, Washington, DC "Cellular Response to Phase-separated Blends of Tyrosine-derived Polycarbonates."
ACS National Meeting, Aug. 30, 2005, Washington, DC "Bioactive Surface Gradients to Control Surface Adhesion." (*invited*)

2000-2004

NCMC-6: Advanced Materials Forum, Nov. 8, 2004, Gaithersburg, MD "Investigation of Cell-Substrate Interactions via Bio-active Surfaces." (*invited*)
Surfaces in Biomaterials Foundation, Oct. 29, 2004, Baltimore MD "Investigation of Cell Substrate Interactions via Bioactive Surface Gradients."
7th New Jersey Symposium on Biomaterials Science, Oct. 22, 2004, New Brunswick, NJ "Gene Expression Profiles of Cells in Response to Tyrosine Polycarbonate Blends." (*invited*)
ACS National Meeting, Spring 2004, Anaheim, CA "Quantitative Response Measurement of Cell Substrate Interactions via RT-PCR."
ACS National Meeting, Spring 2003, New Orleans, LA "In vitro transduction of PTD-functionalized SCK nanoparticles and evaluation of their toxicity and immunogenicity."
ACS National Meeting, Fall 2002, Boston, MA "Biocompatible Surface Functionalized Shell Crosslinked Nanoparticles for use in Biological Applications."
ACS National Meeting, Fall 2001, Chicago, IL "Preparation of Triterpticin Block Copolymer Bio-conjugates by Fluorinated Nitroxide Mediated Radical Polymerization on Solid Support."
ACS National Meeting, Fall 2000, Washington, DC "Radical Based Preparation of Block Copolymers Containing Fluorine tags: Tools for Detailed Analysis of Nanostructured Materials."

COLLABORATORS (PAST 4 YEARS AND PRESENT)

The University of Akron

Professor Steven ZD Cheng, Department of Polymer Science
Professor Xiong Gong, Department of Polymer Engineering
Professor Alamgir Karim, Department of Polymer Engineering
Professor Darrell H. Reneker, Department of Polymer Science
Professor Bryan Vogt, Department of Polymer Engineering

Professor Shi-Qing Wang, Department of Polymer Science
Professor Robert A. Weiss, Department of Polymer Engineering
Professor Chrys Wesdemiotis, Department of Polymer Science and Chemistry
Professor Rebecca Willits, Department of Biomedical Engineering

Clemson University

Professor Robert A. Latour, Department of Bioengineering

Akron Children's Hospital

Dr. Todd Ritzman, Department of Orthopedic Surgery

Rutgers, the State University of New Jersey

Professor Joachim Kohn, Department of Chemistry & New Jersey Center for Biomaterials
Professor Prabhas V. Moghe, Department of Chemical and Biological Engineering

Summa Health Systems

Scott D Weiner, MD, Department of Orthopedic Surgery

State University of New York – Stonybrook

Professor Richard A. L. Clark, MD, Department of Biomedical Engineering

The Ohio State University

Professor David Dean – Department of Plastic Surgery & Biomedical Engineering

The Ohio State University & Nationwide Children's Hospital

Christopher Breuer, MD – Department of Vascular Surgery & Biomedical Engineering

The Methodist Hospital Research Institute

Brad K. Weiner, MD, Department of Orthopedic Surgery
Ennio Tascotti, PhD, Department of Nanomedicine

University of Queensland, AUS

Professor Justin Cooper-White, Department of Chemical Engineering

University of Warwick, UK

Professor Andrew A. P. Dove, Department of Chemistry