

William Mike Gramlich, Ph. D.

Associate Professor of Chemistry

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Education

Ph.D. in Chemical Engineering, University of Minnesota	2012
Thesis Advisor: Marc A. Hillmyer	
B.S. in Chemical Engineering, University of Maine	2006
Thesis Advisors: David J. Neivandt and Douglas J. Gardner	

Professional Positions

University of Maine – Department of Chemistry	2013 – present
Associate Professor of Chemistry	2019 – present
Associate Faculty, UMaine Institute of Medicine	2020 – present
Associate Faculty, Forest Bioproducts Research Initiative	2018 – present
Assistant Professor of Chemistry	2013 – 2019
Cooperating Faculty, Advanced Structures and Composites Center	2013 – present
Graduate Faculty, Graduate School of Biomedical Sciences and Engineering	2013 – present
University of Pennsylvania – Department of Bioengineering	2012 – 2013
Postdoctoral Research Fellow, Research advisor: Jason A. Burdick	

Professional Activities

Special Recognition and Awards

University of Maine Pretenure Research and Creative Activity Fellowship	2014 – 2015
Gramlich <i>et al.</i> <i>Biomaterials</i> 2013 was featured as an Editor's Choice Article in Science	2013

University of Maine

Faculty Mentor for Tomas Marangoni in Department of Chemistry	2022 – present
EMPOWER Faculty Mentor for Bashir Khoda in Department of Mechanical Engineering	2021 – 2022
Department of Chemistry Graduate Coordinator	2019 – 2022
ACS Student Chapter Faculty Advisor	2014 – present
Graduate admissions committee – Department of Chemistry	2014 – present
Member of University of Maine Paper Surface Science Program	2013 – present
Chair of Graduate Admissions for Graduate School of Biomedical Sciences and Engineering	2018 – 2020
University of Maine Center for Undergraduate Research Fellow	2014 – 2016
Graduate admissions committee – Graduate School of Biomedical Sciences and Engineering	2013 – 2017
Grad board representative – Graduate School of Biomedical Sciences and Engineering	Fall 2013

Professional Organizations

Member American Chemical Society, Member Society for Biomaterials

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Peer Reviewed Publications (* denotes W. M. Gramlich as corresponding author)

- 48) Morrison, T. X.; Gramlich, W. M.* “Tunable, thiol-ene, interpenetrating network hydrogels of norbornene-modified carboxymethyl cellulose and cellulose nanofibrils.” *Carbohydrate Polymers* **2023**, *319*, 121173.
- 47) Driscoll, M. E.; Kelly, P. V.; Gramlich, W. M.* “Impact of Aqueous Grafting of Polystyrene through Methacrylate-Modified Cellulose Nanofibrils on Emulsion Stabilization and Drying Behavior.” *Langmuir* **2023**, *39*, 7079 – 7090.
- 46) Kelly, P. V.; Shams Es-haghi, S.; Lamm, M. E.; Copenhaver, K.; Ozcan, S.; Gardner, D. J.; Gramlich, W. M.* “Polymer-Grafted Cellulose Nanofibrils with Enhanced Interfacial Compatibility for Stronger Poly(lactic acid) Composites.” *ACS Applied Polymer Materials* **2023**, *5*, 3661 – 3676.
- 45) Khoda, B.; Gramlich, W. M.; Shovon, SM N.; Khalil, I. “Effect of molecular weight on polymer solution facilitated transfer of non-Brownian particles.” *Progress in Organic Coatings* **2023**, *176*, 107394.
- 44) Christau, S.; Alyamac-Seydibeyoglu, E.; Thayer, K.; Gramlich, W. M.* “Effects of an aqueous surface modification via a grafting-through polymerization approach on the fibrillation and drying of bleached softwood kraft pulp.” *Cellulose* **2023**, *30*, 901-914.
- 43) Wang, L.; Kelly, P. V.; Ozveren, N.; Zhang, X.; Korey, M.; Chen, C.; Li, K.; Bhandari, S.; Tekinalp, H.; Zhao, X.; Wang, J.; Seydibeyoglu, M. O.; Alyamac-Seydibeyoglu, E.; Gramlich, W. M.; Tajvidi, M.; Webb, E.; Ozcan, S.; Gardner, D. J. “Multifunctional polymer composite coatings and adhesives by incorporating cellulose nanomaterials.” *Matter* **2023**, *6*, 344 – 372.
- 42) Lamm, M. E.; Li, K.; Copenhaver, K.; Kelly, P. V.; Senkum, H.; Tekinalp, H.; Gramlich, W. M.; Ozcan, S. “Aqueous-based polyimine functionalization of cellulose nanofibrils for effective drying and polymer composite reinforcement.” *ACS Applied Polymer Materials* **2022**, *4*, 7674 – 7684.
- 41) Shovon, Naser S. M.; Alam, A.; Gramlich, W. M.; Khoda, B. “Micro-particle entrainment from density mismatched liquid carrier system.” *Scientific Reports* **2022**, 9806. DOI: 10.1038/s41598-022-14162-5
- 40) Copenhaver, K.; Li, K.; Wang, L.; Lamm, M.; Zhao, X.; Korey, M.; Neivandt, D.; Dixon, B.; Sultana, S.; Kelly, P.; Gramlich, W. M.; Tekinalp, H.; Gardner, D. J.; MacKay, S.; Nawaz, K.; Ozcan, S. “Pretreatment of lignocellulosic feedstocks for cellulose nanofibril production.” *Cellulose* **2022**, *29*, 4835 – 4876.
- 39) Flanders, M.; Gramlich, W. M.* “Water-Soluble and Degradation-Resistant Curcumin Copolymers from Reversible Addition–Fragmentation Chain (RAFT) Copolymerization.” *Macromolecules* **2022**, *55*, 4064 – 4075.
- 38) Tavana, J.; Faysal, A.; Vithanage, A.; Gramlich, W. M.*; Schwartz, T. J. “Pathway to fully-renewable biobased polyesters derived from HMF and phenols.” *Polymer Chemistry* **2022**, *13*, 1215 – 1227.
- 37) Zhu, Y.; Bousfield, D.; Gramlich, W. M.* “The influence of pigment modulus on failure resistance of paper barrier coatings.” *Nordic Pulp and Paper Research Journal* **2021**, *37*, 97 – 107.
- 36) Kelly, P. V.; Gardner, D. J.; Gramlich, W. M.* “Optimizing lignocellulosic nanofibril dimensions and morphology by mechanical refining for enhanced adhesion.” *Carbohydrate Polymers* **2021**, *273*, 118566.
- 35) Senkum, H.; Kelly, P. V.; Gramlich, W. M.* “Water-Stable Thin-Film Nanostructures from Amphiphilic Cationic Bottlebrush Block Copolymers by Grafting-through Ring-Opening Metathesis Polymerization.” *Macromolecules* **2021**, *54*, 7987-7997.
- 34) Fein, K.; Bousfield, D. W.; Gramlich, W. M.* “Processing Effects on Structure, Strength, and Barrier Properties of Refiner-Produced Cellulose Nanofibril Layers.” *ACS Applied Polymer Materials* **2021**, *3*, 3666-3678.

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- 33) Zhu, Y.; Bousfield, D.; Gramlich, W. M.* "Failure prediction of waterborne barrier coatings during folding." *Journal of Coating Technology and Research* **2021**, *18*, 1117-1129.
- 32) Dadoo, N.; Zeitler, S.; McGovern, A. D.; Gramlich, W. M.* "Waterborne functionalization of cellulose nanofibrils with norbornenes and subsequent thiol-norbornene gelation to create robust hydrogels." *Cellulose* **2021**, *28*, 1339 - 1353.
- 31) Kelly, P. V.; Cheng, P.; Gardner, D. J.; Gramlich, W. M.* "Aqueous Polymer Modification of Cellulose Nanofibrils by Grafting-Through a Reactive Methacrylate Group." *Macromolecular Rapid Communications* **2021**, *42*, 2000531.
- 30) Fein, K.; Bousfield, D.; Gramlich, W. M.* "Thiol-norbornene reactions to improve natural rubber dispersion in cellulose nanofiber coatings." *Carbohydrate Polymers* **2020**, *250*, 117001.
- 29) Hossen, M.R., Talbot, M.W., Gramlich, W.M., Mason, M. D. "Robust nanofibrillated cellulose composite SERS substrate for capillary preconcentration and trace level detection of organic molecules." *Cellulose* **2020**, *27*, 10119 – 10137.
- 28) Ji, S.; Abaci, A.; Morrison, T.; Gramlich, W. M.; Guvendiren, M. "Novel bioinks from UV-responsive norbornene-functionalized carboxymethyl cellulose macromers." *Bioprinting* **2020**, *18*, e00083.
- 27) Senkum, H.; Gramlich, W. M.* "Cationic bottlebrush polymers from quaternary ammonium macromonomers by grafting-through ring-opening metathesis polymerization." *Macromolecular Chemistry and Physics* **2020**, *221*, 1900476.
- 26) Fein, K.; Bousfield, D.; Gramlich, W. M.* "The influence of versatile thiol-norbornene modifications to cellulose nanofibers on rheology and film properties." *Carbohydrate Polymers* **2020**, *230*, 115672
- 25) Purington, E.; Bousfield, D.; Gramlich, W. M.* "Fluorescent dye adsorption in aqueous suspension to produce tagged cellulose nanofibers for visualization on paper." *Cellulose* **2019**, *26*, 5117 – 5131.
- 24) Zhu, Y.; Bousfield, D.; Gramlich, W. M.* "The influence of pigment type and loading on water vapor barrier properties of paper coatings before and after folding." *Progress in Organic Coatings* **2019**, *132*, 201 – 210.
- 23) Salari, M.; Bitounis, D.; Bhattacharya, K.; Pyrgiotakis, G.; Zhang, Z.; Purington, E.; Gramlich, W. M.; Grondin, Y.; Rogers, R.; Bousfield, D.; Demokritou, P. "Development & characterization of fluorescently tagged nanocellulose for nanotoxicological studies." *Environmental Science: Nano* **2019**, *6*, 1516 – 1526.
- 22) McOscar, T. V. C.; Gramlich, W. M.* "Hydrogels from Norbornene-Functionalized Carboxymethyl Cellulose Using a UV-Initiated Thiol-Ene Click Reaction." *Cellulose* **2018**, *25*, 6531 – 6545.
- 21) Hossen, M. R.; Dadoo, N.; Holomakoff, D. G.; Co, A.; Gramlich, W. M.; Mason, M. D. "Wet Stable and Mechanically Robust Cellulose Nanofibrils (CNF) Based Hydrogel." *Polymer* **2018**, *151*, 231 – 241.
- 20) Flanders, M. J.; Gramlich, W. M.* "Reversible-addition fragmentation chain transfer (RAFT) mediated depolymerization of brush polymers." *Polymer Chemistry* **2018**, *9*, 2328 – 2335.
- 19) Wang, L.; Gramlich, W. M.; Gardner, D. J.; Han, Y.; Tajvidi, M. "Spray-Dried Cellulose Nanofibril-Reinforced Polypropylene Composites for Extrusion-Based Additive Manufacturing: Nonisothermal Crystallization Kinetics and Thermal Expansion." *Journal of Composites Science* **2018**, *2*, 7.
- 18) Kwon, M. Y.; Vega, S. L.; Gramlich, W. M.; Kim, M.; Mauck, R. L.; Burdick, J. A. "Dose and Timing of N-Cadherin Mimetic Peptides Regulate MSC Chondrogenesis within Hydrogels." *Advanced Healthcare Materials* **2018**, 1701199.

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- 17) Ghasemi, S.; Tajvidi, M.; Bousfield, D. W.; Gardner, D. J.; Gramlich, W. M. "Dry-Spun Neat Cellulose Nanofibril Filaments: Influence of Drying Temperature and Nanofibril Structure on Filament Properties." *Polymers* **2017**, *9*, 392.
- 16) Purington, E.; Blakely, A.; Bousfield, D.; Gramlich, W. M.* "Visualization of latex and starch in paper coatings by tagging with fluorescent dyes." *Nordic Pulp and Paper Research Journal* **2017**, *32*, 395-406.
- 15) Dadoo, N.; Landry, S. B.; Bomar, J. D.; Gramlich, W. M.* "Synthesis and spatiotemporal modification of biocompatible and stimuli responsive carboxymethyl cellulose hydrogels using thiol-norbornene chemistry." *Macromolecular Bioscience* **2017**, *17*, 1700107.
- 14) Wang, L.; Gramlich, W. M.; Gardner, D. J. "Improving the Impact Strength of Poly(lactic acid) (PLA) in Fused Layer Modeling (FLM)." *Polymer* **2017**, *114*, 242-248.
- 13) Vithanage, A. E.; Chowdhury, E.; Alejo, L. D.; Pomeroy, P. C.; DeSisto, W. J.; Frederick, B. G.; Gramlich, W. M.* "Renewably sourced phenolic resins from lignin bio-oil." *Journal of Applied Polymer Science* **2017**, *134*, 44827.
- 12) Dadoo, N.; Gramlich, W. M.* "Spatiotemporal modification of stimuli responsive hyaluronic acid/poly(N-isopropylacrylamide) hydrogels." *ACS Biomaterials Science and Engineering* **2016**, *2*, 1341-1350.
- 11) Wade, R. J.; Bassin, E. J.; Gramlich, W. M.; Burdick, J. A. "Nanofibrous hydrogels with spatially patterned biochemical signals to control cell behavior." *Advanced Materials* **2015**, *27*, 1356-1362.
- 10) Gramlich, W. M.* "Toughening polylactide with phase-separating complex copolymer architectures." *Macromolecular Chemistry and Physics* **2015**, *216*, 145-155.
- 9) Kerstetter, J. L.; Gramlich, W. M.* "Nanometer-scale Self-Assembly of Amphiphilic Copolymers to Control and Prevent Biofouling." *Journal of Materials Chemistry B* **2014**, *2*, 8043-8052.
- 8) Gramlich, W. M.; Rai, R.; Holloway, J. L.; Burdick, J. A. "Transdermal gelation of methacrylated macromers with near-infrared light and gold nanorods." *Nanotechnology* **2014**, *25*, 014004.
- 7) Gramlich, W. M.; Kim, I. L.; Burdick, J. A. "Synthesis and orthogonal photopatterning of hyaluronic acid hydrogels with thiol-norbornene chemistry." *Biomaterials* **2013**, *34*, 9803-9811. **(Featured as an Editor's Choice Article in Science, 342, 165.)**
- 6) Moughton, A. O.; Sagawa, T.; Gramlich, W. M.; Seo, M.; Lodge, T. P.; Hillmyer, M. A. "Synthesis of block polymer *mikto*brushes." *Polymer Chemistry* **2013**, *4*, 166-173.
- 5) Gramlich, W. M.; Theryo, G.; Hillmyer, M. A. "Copolymerization of isoprene and hydroxyl containing monomers by controlled radical and emulsion methods." *Polymer Chemistry* **2012**, *3*, 1510-1516.
- 4) Gramlich, W. M.; Hillmyer, M. A. "Catalytic synthesis and post polymerization functionalization of conjugated polyisoprene." *Polymer Chemistry* **2011**, *2*, 2062-2067.
- 3) Gramlich, W. M.; Robertson, M. L.; Hillmyer, M. A. "Reactive compatibilization of poly(L-lactide) and conjugated soybean oil." *Macromolecules* **2010**, *43*, 2313-2321.
- 2) Robertson, M. L.; Chang, K.; Gramlich, W. M.; Hillmyer, M. A. "Toughening of polylactide with polymerized soybean oil." *Macromolecules* **2010**, *43*, 1807-1814.
- 1) Gramlich, W. M.; Gardner, D. J.; Neivandt, D. J. "Surface treatments of wood-plastic composites (WPCs) to improve adhesion." *Journal of Adhesion Science and Technology* **2006**, *20*, 1873-1887.