

# William Mike Gramlich, Ph. D.

## Associate Professor of Chemistry

Department of Chemistry  
University of Maine, 171 Aubert Hall  
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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 *et al.* *Biomaterials* **2013** was featured as an Editor's Choice Article in Science 2013

#### **University of Maine**

Department of Chemistry Graduate Coordinator 2019 – present  
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

- 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**, DOI: 10.1039/d1py01441b
- 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**, DOI: 10.1515/npprj-2021-0052
- 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. DOI: 10.1016/j.carbpol.2021.118566
- 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. DOI: 10.1021/acs.macromol.1c01161
- 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. DOI: 10.1021/acsapm.1c00620
- 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. DOI: 10.1007/s11998-021-00465-1
- 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**. <https://doi.org/10.1007/s10570-020-03478-y>
- 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.

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- 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.
- 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.

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- 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.

## Invited Presentations

- 12) **William M. Gramlich** "Waterborne modifications to CNF" Cellulose Nanomaterials Forum, Orono, ME. August 26, 2021.
- 11) **William M. Gramlich** "Waterborne modifications to CNF" Cellulose Nanomaterials Forum, Orono, ME. August 29, 2019.
- 10) **William M. Gramlich** "New sustainable, forest-based bioplastics - Creating sustainable polyesters with higher usable temperatures" Bioplastics Summit, Orono, ME. May 2, 2019.
- 9) **William M. Gramlich** "Spatiotemporally modifiable hydrogels as extracellular matrix mimics" Maine Biological and Medical Science Symposium, Bar Harbor, ME. April 29, 2017.
- 8) **William M. Gramlich** "Spatiotemporally Modifiable Hydrogels from Cellulose" BioEngineering 2017: BioMEMS, 3D-Bioprinting, Tissue Engineering & Synthetic Biology Conference, Boston, MA. March 17, 2017.
- 7) **William M. Gramlich** "Spatiotemporally modifiable hydrogels as controllable extracellular matrix mimics" The Jackson Laboratory, Bar Harbor, ME. December 9, 2016.
- 6) **William M. Gramlich** "Next Generation Hydrogels from Renewable Sources for Biomedical Applications" Colby College, Waterville, ME. September 30, 2016.
- 5) Nayereh Dadoo, Samuel Landry, **William M. Gramlich** "Green methods to functionalize cellulose derivatives to create robust hydrogels" American Chemical Society Fall National Meeting, Philadelphia, PA. August 22, 2016.
- 4) Nayereh Dadoo, **William M. Gramlich** "Modular assembly of spatiotemporally patternable, stimuli responsive hydrogels" American Chemical Society Spring National Meeting, San Diego, CA. March 14, 2016.
- 3) **William M. Gramlich** "Creating hierarchically structured sustainable materials using modular synthesis strategies" Oak Ridge National Laboratory Center for Nanophase Materials Sciences User Meeting, Oak Ridge, TN. September 02, 2015.

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- 2) **William M. Gramlich** "Synthesis of spatially and temporally controlled hydrogels" University of Maine Department of Chemical and Biological Engineering Seminar Series, Orono, ME. January 24, 2014.
- 1) **William M. Gramlich** "Hierarchical patterning of polymers towards creating biomimetic surfaces" University of Maine Physics Colloquium, Orono, ME. November 22, 2013.