

## CURRICULUM VITAE

# Jeffrey Clayton Foster, PhD

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### **EDUCATION:**

2012 - 2017

#### **PhD in Chemistry**

Virginia Polytechnic Institute and State University

Blacksburg, Virginia, USA

Supervised by Prof. John Matson

**Dissertation Title: Synthesis, Properties, and Biology of Advanced H<sub>2</sub>S-Releasing Materials**

2010 - 2012

#### **MSc in Polymers and Coatings Science**

California Polytechnic State University

San Luis Obispo, California, USA

Supervised by Prof. Chad Imoos, Prof. Raymond Fernando, Prof. Erik Sapper

**Thesis Title: Development of a Quantitative Fluorescence Method for Measurement of Corrosion in Coated Aluminum**

2005 - 2010

#### **BSc in Biochemistry**

California Polytechnic State University

San Luis Obispo, California, USA

### **RESEARCH EXPERIENCE:**

Present - Sept 2018

University of Birmingham, Birmingham, United Kingdom

#### **Group Leader**

Supervisor: Prof. Rachel O'Reilly

Projects: Extension of predictive methodology to ROMPISA, discovery of new morphological transitions based on polymersome fusion, grafting-through polymerization of DNA macromonomers

Aug 2017 - Sept 2018

University of Warwick, Coventry, United Kingdom

#### **Research Fellow**

Supervisor: Prof. Rachel O'Reilly

Projects: Development of strategies for aqueous metathesis polymerization, application of metathesis chemistry to DNA-templated synthesis, methods for predicting monomers for polymerization-induced self-assembly using hydrophobicity calculations

### **TEACHING AND MENTORING EXPERIENCE:**

- Co-mentoring of 1 postdoc, 4 PhD students, and 2 MSci student in the School of Chemistry at the University of Birmingham
- Lectures and workshops to graduate students during Research Fellowship – Supramolecular assembly, SEC, carbodiimide coupling, and retrosynthetic analysis
- Co-mentoring of 1 PhD student and 10 bachelors students (including 4 NSF REU summer students) in the Department of Chemistry at Virginia Polytechnic Institute and State University

- Teaching Assistant, Virginia Polytechnic Institute and State University, 2012-2013, Course: General Chemistry Laboratory *\*\*Appointed Head Teaching Assistant in 2012*
- Teaching Assistant, California Polytechnic State University, San Luis Obispo, 2010-2012, Course: Polymer Physical Chemistry and Analysis

#### **AWARDS:**

- Future Faculty Scholar, ACS Division of Polymeric Materials: Science and Engineering, **2019**
- Best Presentation Award, International Symposium of Bio-related Polymers, **2018**
- Chemistry Graduate Student Award, Virginia Tech Department of Chemistry, **2016**
- Macromolecules Innovation Institute Travel Award, **2016**
- ACS Excellence in Graduate Polymer Research, **2016**
- John Wiley Book Award, **2016**
- Virginia Tech Graduate School Doctoral Assistantship, **2015**
- Chevron-Phillips Chemical Professional Excellence Travel Award, **2014**
- Coating Industry Education Fund Scholarship, **2011**

#### **PROFESSIONAL ACTIVITIES AND MEMBERSHIPS:**

- Grant Reviewer for Austrian Research Council
- Electron Microscopy Committee Member, University of Birmingham
- Reviewer for Macromolecules
- Reviewer for ACS Macro Letters
- Reviewer for Macromolecules
- Reviewer for Polymer
- Member of the American Chemical Society
- Member of the Royal Society of Chemistry

#### **PUBLICATIONS:**

1. Foster, J. C.; Powell, C. R.; Radzinski, S. C.; Matson, J. B. "S-Aroylthiooximes: A Facile Route to Hydrogen Sulfide Releasing Compounds with Structure-Dependent Release Kinetics" *Org. Lett.* **2014**, 16, 1558-1561.
2. Foster, J. C.; Matson, J. B. "Functionalization of Methacrylate Polymers with Thiooximes: A Robust Post-Polymerization Modification Reaction and a Method for the Preparation of H<sub>2</sub>S-Releasing Polymers" *Macromolecules* **2014**, 47, 5089-5095.
3. Foster, J. C.; Radzinski, S. C.; Matson, J. B. "Synthesis of Bottlebrush Polymers via Grafting-From and Grafting-Through Approaches Using a RAFT Chain Transfer Agent with a ROMP-Active Z-Group" *Polym. Chem.* **2015**, 6, 5643-5652.
4. Carter, J. M.; Qian, Y.; Foster, J. C.; Matson, J. B. "Peptide-Based Hydrogen Sulfide-Releasing Gels" *Chem. Commun.* **2015**, 51, 13131-13134.
5. Foster, J. C.; Radzinski, S. C.; Lewis, S. E.; Slutzker, M. B.; Matson, J. B. "Norbornene-containing dithiocarbamates for use in reversible addition-fragmentation chain transfer (RAFT) polymerization and ring-opening metathesis polymerization (ROMP)" *Polymer* **2015**, 79, 205-211.
6. Radzinski, S. C.; Foster, J. C.; Matson, J. B.; "Preparation of Bottlebrush Polymers via a One-Pot Ring-Opening Polymerization (ROP) and Ring-Opening Metathesis Polymerization (ROMP) Grafting-Through Strategy" *Macromol. Rapid. Commun.* **2016**, 37 (7), 616-621.
7. Foster, J. C.; Radzinski, S. C.; Matson, J. B. "Bottlebrush Synthesis by Ring-Opening Metathesis Polymerization: The Significance of the Anchor Group" *J. Am. Chem. Soc.* **2016**, 138 (22), 6698-7004.
8. Powell, C. R.; Foster, J. C.; Okyere, B.; Theus, M. H.; Matson, J. B. "Therapeutic Delivery of H<sub>2</sub>S via COS: Small Molecule and Polymeric Donors with Benign Byproducts" *J. Am. Chem. Soc.* **2016**, 138 (41), 13477-13480.

9. Foster, J. C.; Radzinski, S. C.; Lewis, S. E.; French, E. V.; Matson, J. B. “Factors Affecting Bottlebrush Polymer Synthesis by the Transfer-to Method Using Reversible Addition–Fragmentation Chain Transfer (RAFT) Polymerization” *Polym. Chem.* **2017**, 8, 1636-1643.
10. Foster, J. C.; Radzinski, S. C.; Finkielstein, C. V.; Matson, J. B. “H<sub>2</sub>S-Releasing Polymer Assemblies for Studying Selective Cell Toxicity” *Mol. Pharm.* **2017**, 14, 1300-1306.
11. Foster, J. C.; Radzinski, S. C.; Matson, J. B. “Graft Polymer Synthesis by RAFT Transfer-to” *J. Poly. Sci. Part A: Polym. Chem.* **2017**, 55, 2865-2876.
12. Foster, J. C.; Radzinski, S. C.; Scannelli, S. J.; Weaver, J. R.; Arrington, K. J.; Matson, J. B. “Tapered Bottlebrush Polymers: Cone-shaped Nanostructures by Sequential Addition of Macromonomers” *ACS Macro. Lett.* **2017**, 6, 1175-1179.
13. Foster, J. C.; Varlas, S.; Blackman, L. B.; Arkinstall, L.; O’Reilly, R. K. “Ring-Opening Metathesis Polymerization in Aqueous Media using a Macroinitiator Approach” *Angew. Chemie. Int. Ed.* **2018**, 57(33), 10672-10676.
14. Couturaud, B.; Georgiou, P. G.; Varlas, S.; Jones, J. R.; Arno, M. C.; Foster, J. C.; O’Reilly, R. K. “Poly(Pentafluorophenyl Methacrylate)-Based Nano-Objects Developed by Photo-PISA as Scaffolds for Post-Polymerization Functionalization” *Macromol. Rapid Commun.* **2018**, 40, 1800460.
15. Inam M.; Foster, J. C.; Gao, J.; Hong, Y.; Du, J.; Dove, A. P.; O’Reilly, R. L. “Size and shape affects the antimicrobial activity of quaternized nanoparticles” *J. Poly. Sci. Part A: Polym. Chem.* **2018**, 57 (3), 255-259.
16. Foster, J. C.; Varlas, S.; Couturaud, B.; Jones, J. R.; Keogh, R.; Mathers, R. T.; O’Reilly, R. K.; “Predicting Monomers for use in Polymerization Induced Self-Assembly” *Angew. Chemie. Int. Ed.* **2018**, 57, 15733-15737. **Selected as a Very Important Paper.**
17. Foster, J. C.; Carrazzone, R. J.; Spear, N. B.; Radzinski, S. C.; Arrington, K. J.; Matson, J. B. “Tuning H<sub>2</sub>S Release by Controlling Mobility in a Micelle Core” *Macromolecules* **2019**, 52, 1104-1111.
18. Foster, J. C.; Varlas, S.; Couturaud, B.; Coe, Z.; O’Reilly, R. K.; “Getting into Shape: Reflections on a New Generation of Cylindrical Nanostructures Self-Assembly using Polymer Building Blocks” *J. Am. Chem. Soc.* **2019**, 141 (7), 2742-2753.
19. Qian, Y.; Kujar, K.; Foster, J. C.; Matson, J. B. “Supramolecular Tuning of H<sub>2</sub>S Release from Aromatic Peptide Amphiphile Gels: Effect of Core Unit Substituents” *Biomacromolecules* **2019**, 20, 1077-1086.
20. Foster, J. C.; O’Reilly, R. K. “How to better control polymer chemistry” *Science* **2019**, 363 (6434) 466-472.
21. Varlas, S.; Foster, J. C.; Arkinstall, L. A.; Jones, J. R.; Keogh, R.; Mathers, R. T.; O’Reilly, R. K. “Predicting Monomers for Use in Aqueous Ring-Opening Metathesis Polymerization-Induced Self-Assembly” *ACS Macro. Lett.* **2019**, 8, 466-472.
22. Powell, C. R.; Foster, J. C.; Swilley, S. N.; Scannelli, S. J.; Troya, D.; Matson, J. B. “Self-Amplified Depolymerization of Oligo(Thiourethanes) for the Release of COS/H<sub>2</sub>S” *Polym. Chem.* **2019**, 10, 2991-2995.
23. Varlas, S. V.; Foster, J. C.; Georgiou, P.; Keogh, R.; Husband, J.; Williams, D.; O’Reilly, R. K. “Tuning the membrane permeability of nanoreactors developed by aqueous emulsion polymerization-induced self-assembly” *Nanoscale*, **2019**, 11, 12643-12654.
24. Pearce, A. J.; Foster, J. C.\*; O’Reilly, R. K. “Recent Developments in Entropy-driven Ring-Opening Metathesis Polymerization: Mechanistic Considerations, Unique Functionality, and Sequence Control” *J. Poly. Sci. Part A: Polym. Chem.* **2019**, 148, e59722.
25. Varlas, S. V.; Foster, J. C.\*; O’Reilly, R. K. “Ring-Opening Metathesis Polymerization-Induced Self-Assembly (ROMPISA)” *Chem. Commun.* **2019**, 55, 9066-9071.
26. Couturaud, B.; Houston, Z.; Cowin, G. J.; Prokes, I.; Foster, J. C.; Thurecht, K.; O’Reilly, R. K.; “A supramolecular fluorine magnetic resonance spectroscopy probe polymer based on Passerini bifunctional monomer” **2019**, *submitted*.
27. Varlas, S.; Keogh, R.; Xie, Y.; Foster, J. C.\*; O’Reilly, R. K. “Polymerization-Induced Polymersome Fusion” **2019**, *submitted*.

## **CONFERENCES – ORAL PRESENTATIONS:**

- “Metathesis Chemistry in Aqueous Media”, *258<sup>th</sup> National Meeting of the American Chemical Society*, San Diego, CA, USA **2019**
- “Nanostructure synthesis by ring-opening metathesis polymerization-induced self-assembly”, *258<sup>th</sup> National Meeting of the American Chemical Society*, San Diego, CA, USA **2019**
- “Advances in Aqueous Metathesis”, *23<sup>rd</sup> International Symposium on Metathesis and Related Chemistry*, Barcelona, Spain **2019**
- “Advances in Aqueous Ring-Opening Metathesis Polymerization” Graduate Research Symposium, *Gordon Research Conference – Polymers*, South Hadley, MA, USA **2019**
- “Ring-Opening Metathesis Polymerization in Aqueous Media using a Macroinitiator Approach” *Bordeaux Polymer Conference*, Bordeaux, France **2018**
- “Self-Assembly of Nucleobase-Functionalized Bottlebrush Polymers” *255th National Meeting of the American Chemical Society*, New Orleans, LA, USA **2018**
- “A general strategy for preparing block copolymers and nanoparticles via ROMP in aqueous media”, *255th National Meeting of the American Chemical Society*, New Orleans, LA, USA **2018**
- “Anti-Cancer Activity of H<sub>2</sub>S-Releasing Micelles” *12th National Graduate Research Polymer Conference*, Akron, OH **2016**
- “Morphological Control over the Release Profile of H<sub>2</sub>S-Releasing Micelles” *250th National Meeting of the American Chemical Society*, San Diego, CA **2016**
- “Polymer Functionalization with Thiooximes: A facile Route to H<sub>2</sub>S-Releasing Polymers” *248th National Meeting of the American Chemical Society*, San Francisco, CA **2014**

#### **CONFERENCES – POSTER PRESENTATIONS:**

- “Nanoparticle Synthesis using Aqueous Ring Opening Metathesis Polymerization” *14<sup>th</sup> International Conference on Materials Chemistry*, Birmingham, UK **2019**
- “Aqueous Metathesis Chemistry Using a Macroinitiator Approach” *Gordon Research Conference – Polymers*, South Hadley, MA **2019**
- “Supramolecular Scaffolds for Therapeutic Delivery of Hydrogen Sulfide” *Gordon Research Conference – Polymers*, South Hadley, MA **2017**
- “Synthesis of Tapered Bottlebrush Polymers via Sequential Addition of Macromonomers” *Gordon Research Conference – Polymers*, South Hadley, MA **2017**
- “H<sub>2</sub>S-Releasing Polymer Assemblies for Studying Selective Cell Toxicity” *MII Technical Conference and Review*, Blacksburg, VA **2016**
- “Anti-Cancer Activity of H<sub>2</sub>S-Releasing Micelles” *250th National Meeting of the American Chemical Society*, San Diego, CA **2016**
- “Anti-Cancer Activity of H<sub>2</sub>S-Releasing Micelles” *VTCCDD Drug Discovery Day*, Blacksburg, VA **2015**
- “Advanced H<sub>2</sub>S-Releasing Materials for Therapeutic Applications” *Gordon Research Conference – Polymers*, South Hadley, MA **2015**
- “Advanced H<sub>2</sub>S-Releasing Materials for Therapeutic Applications” *MII Technical Conference and Review*, Blacksburg, VA **2015**
- “Preparation of H<sub>2</sub>S-Relasing Prodrugs and Materials for Therapeutic Applications” *VTCCDD Drug Discovery Day*, Blacksburg, VA **2014**
- “Development of a Quantitative Fluorescence Method for Measurement of Corrosion in Coated Aluminum” *Western Coatings Symposium*, Las Vegas, NV **2011**