# Eric Michael Bachelder

Division of Molecular Pharmaceutics, Eshelman School of Pharmacy, University of North Carolina
4210 Marsico Hall, Chapel Hill, NC 27599 ● ebacheld@email.unc.edu ● 919-962-4857

## EDUCATION

**The University of Nebraska, Chemical Engineering** 1/2004 – 8/2006
**Virginia Polytechnic and State University** 8/2000 – 12/2003
Advisor: Prof. William Velander (Department Chair at Nebraska in August 2003) PhD

**Michigan State University, Chemical Engineering** 8/1995 – 5/1999
Graduated with Honors from the Honors College BS

## PROFESSIONAL EXPERIENCE

**University of North Carolina College of Pharmacy**
Associate Professor 8/2019-present
Assistant Professor 6/2014-8/2019

**The Ohio State University College of Pharmacy**
Assistant Research Professor 2010-2014
Research Scientist 2009-2010

**University of California at Berkeley Chemistry Department** 2006-2009
**Postdoctoral Research Fellow**
Advisor: Prof. Jean M.J. Fréchet

- Invented and patented degradable acid-labile polymer based on dextran.
- Development of novel polyurethane based acid-labile particles for vaccine delivery.
- Led a NIH R01 grant project and mentored three graduate students.
- Established collaboration and financial support with Naval Medical Research Lab regarding encapsulation of vaccine adjuvants in dextran based polymeric nanoparticles.

**National Institutes of Health** 2001-2006
**Pre-doctoral Research Fellow (Graduate Student)**
Adviser: Prof. William Velander/Dr. Polly Matzinger

- Development of immunosensor for the detection of CD4+ T-cells.
- Studied mechanism of oral immunization.
- Investigated how $CD4^+$ T-cells and dendritic cells communicate.
- Utilized microarray to analyze cellular communication.
- Interaction of immune system with biomaterials.

**Michigan State University Department of Chemical Engineering** 5/1998 – 8/1999
**Undergraduate Researcher**
Advisor: Prof. Kris Berglund

- Design of fermentors, cooling coils, and other supporting fermentor equipment.
- Operation and maintenance of distillation column.
- Proprietary study on biodegradable scale inhibitors using light scattering techniques.
- New biodegradable inhibitors were used in industrial type setting.

**MSU Department of Food Science and Post Harvest Research** 5/1994 – 8/1996
**Undergraduate and High School Researcher**
Advisors: Dr. Ian Gray & Dr. David Dilley

- Performed model system production of carcinogens in the process of cooking meats.
- Operated HPLC and GC to analyze extractions.
- Use of competent cells for the production of recombinant protein.
- Performed studies on ethylene receptor knockout transgenic tomato plants.

**PUBLICATIONS**

1. Graham-Gurysh EG, Simpson SS, Pena ES, Woodring RN, Moore KM, Genito CJ, Hipps KA, Singh G, Zamboni WC, Fecci PE, **Bachelder EM**, Ainslie KM. Controlled release of TLR7/8 agonist after tumor resection generates robust immune response against glioblastoma. *In preparation*.
2. Stiepel RT, Simpson SS, Middleton DD, Lukesh NR, Hendy DA, Ontiveros-Padilla L, Ehrenzeller SA, Islam MJ, Pena ES, Carlock MA, Ross TM, **Bachelder EM**, Ainslie KM. Acetalated Dextran Microparticles for the Induction of Antigen-Specific Tolerance in Multiple Sclerosis without Broad Immunosuppression. *In preparation*.
3. Pena ES, Batty CJ, Hendy DA, Shuangshuang Y, Ontiveros-Padilla L, Stiepel RT, Ting JPY, Ainslie KM, **Bachelder EM**. Comparative Study of Acetalated-Dextran Microparticle Fabrication Methods for a Clinically Translatable Subunit-based Influenza Vaccine. *Submitted IJP*
4. Williamson GL, **Bachelder EM**, Ainslie KM. Clinical and pre-clinical methods of heat-stabilization of human vaccines. *Submitted Mol Pharm*.
5. Hendy Da, Ma Y, Dixon TA, Carlock MA, Ross TM, **Bachelder EM**, Ainslie KM, Fenton OS. Polymeric cGAMP Microparticles Affect the Immunogenicity of a Broadly Active Influenza mRNA Lipid Nanoparticle Vaccine. *Submitted JCR.*
6. Hendy DA, Pena ES, Batty CJ, Ontiveros-Padilla L, III JAR, Dixon TA, Middleton DD, Carlock MA, Ross TM, **Bachelder EM**, Ainslie KM. COBRA Hemagglutinin and Cgamp Loaded Ace-Dex Microparticles Provide a Broadly Active and Shelf-Stable Influenza Vaccine Platform. Adv. Therap. 2023, 2300273.
7. Hendy DA, Pena ES, Ontiveros-Padilla L, Dixon TA, Middleton DD, Williamson GL, Lukesh NR, Simpson SS, Stiepel RT, Islam MJ, Carlock MA, Ross TM, **Bachelder EM**, Ainslie KM. Immunogenicity of an adjuvanted broadly active influenza vaccine in immunocompromised and diverse populations. Bioeng Transl Med. 2023;e10634.
8. Hendy DA, Lifshits LM, Batty CJ, Carlock MA, Ross TM, Mousa JJ, **Bachelder EM**, Ainslie KM. Zinc Carnosine Metal-Organic Coordination Polymer as a Potent Broadly Active Influenza Vaccine Platform with In Vitro Shelf-Stability. Mol Pharm. 2023;20(9):4687-97. Epub 20230821.
9. Hendy DA, Johnson-Weaver BT, Batty CJ, **Bachelder EM**, Abraham SN, Staats HF, Ainslie KM. Delivery of small molecule mast cell activators for West Nile Virus vaccination using acetalated dextran microparticles. Int J Pharm. 2023;634:122658. Epub 20230130.
10. Hendy DA, Haven A, **Bachelder EM**, Ainslie KM. Preclinical developments in the delivery of protein antigens for vaccination. Expert Opin Drug Deliv. 2023;20(3):367-84. Epub 20230210.
11. Pena ES, Lifshits LM, Eckshtain-Levi M, **Bachelder EM**, Ainslie KM. Metal-organic coordination polymers for delivery of immunomodulatory agents, and infectious disease and cancer vaccines. Wiley Interdiscip Rev Nanomed Nanobiotechnol. 2023;15(4):e1877. Epub 20230111.
12. Batty CJ, Lifshits LM, Hendy DA, Eckshtain-Levi M, Ontiveros-Padilla LA, Carlock MA, Ross TM, **Bachelder EM**, Ainslie KM. Vinyl Sulfone-functionalized Acetalated Dextran Microparticles as a Subunit Broadly Acting Influenza Vaccine. AAPS J. 2023;25(1):22. Epub 20230131.
13. Rose Lukesh N, Middleton DD, **Bachelder EM**, Ainslie KM. Particle-Based therapies for antigen specific treatment of type 1 diabetes. Int J Pharm. 2023;631:122500. Epub 20221215.
14. Batty CJ, Amouzougan EA, M AC, Ross TM, **Bachelder EM**, Ainslie KM. Sustained delivery of CpG oligodeoxynucleotide by acetalated dextran microparticles augments effector response to Computationally Optimized Broadly Reactive Antigen (COBRA) influenza hemagglutinin. Int J Pharm. 2023;630:122429. Epub 20221125.
15. Jasiewicz NE, Mei KC, Oh HM, Chansoria P, Hendy DA, Bonacquisti EE, **Bachelder EM**, Ainslie KM, Yin H, Qian L, Jensen BC, Nguyen J. ZipperCells Exhibit Enhanced Accumulation and Retention at the Site of Myocardial Infarction. Adv Healthc Mater. 2023;12(4):e2201094. Epub 20221203.
16. Mei KC, Stiepel RT, Bonacquisti E, Jasiewicz NE, Chaudhari AP, Tiwade PB, **Bachelder EM**, Ainslie KM, Fenton OS, Nguyen J. Single-tailed heterocyclic carboxamide lipids for macrophage immune-modulation. Biomater Sci. 2023;11(8):2693-8. Epub 20230411.
17. Pena ES, Lifshits LM, Eckshtain-Levi M, **Bachelder E**, Ainslie KM. Metal-Organic Coordination Polymers for Delivery of Immunomodulatory Agents, and Infectious Disease and Cancer Vaccines WIREs Nanomedicine and Nanobiotechnology 2023;In Press.
18. Ontiveros-Padilla L, Batty CJ, Hendy DA, Pena ES, Roque JA, 3rd, Stiepel RT, Carlock MA, Simpson SR, Ross TM, Abraham SN, Staats HF, **Bachelder EM**, Ainslie KM. Development of a broadly active influenza intranasal vaccine adjuvanted with self-assembled particles composed of mastoparan-7 and CpG. Front Immunol. 2023;14:1103765. Epub 20230324.
19. Batty CJ, Amouzougan EA, Moore KM, Pena ES, **Bachelder EM**, Ainslie KM. Humoral Response to Acetalated

Dextran M2e Vaccine is Enhanced by Antigen Surface Conjugation. Bioconjugate Chem. 2023. *ACS Editors' Choice*

20. Woodring RN, Gurysh EG, **Bachelder EM**, Ainslie KM. Drug Delivery Systems for Localized Cancer Combination Therapy. ACS Appl Bio Mater. 2023;6(3):934-50. Epub 2023/02/16. (Invited)
21. Mei KC, Stiepel RT, Bonacquisti E, Jasiewicz NE, Chaudhari AP, Tiwade PB, **Bachelder EM**, Ainslie KM, Fenton OS, Nguyen J. Single-tailed heterocyclic carboxamide lipids for macrophage immune-modulation. Biomater Sci. 2023;11(8):2693-8. Epub 2023/03/31.
22. Watkins-Schulz R, Batty CJ, Stiepel RT, Schmidt ME, Sandor AM, Chou WC, Ainslie KM, **Bachelder EM**, Ting JP. Microparticle Delivery of a STING Agonist Enables Indirect Activation of NK Cells by Antigen-Presenting Cells. Mol Pharm. 2022;19(9):3125-38. Epub 2022/08/02.
23. McNamara N, Saunders E, Varghese S, Zheng R, Simpson K, Varma DM, Johnson MM, Hasan Zahid MS, **Bachelder EM**, Ainslie KM, No JH, Koh D, Shum D, Das N, Patra B, Roy J, Talukdar A, Ganguly D, McConville M, Baell J. Hit-to-lead optimization of novel phenyl imidazole carboxamides that are active against Leishmania donovani. Eur J Med Chem. 2022;240:114577. Epub 2022/07/11.
24. Stiepel RT, Pena ES, Ehrenzeller SA, Gallovic MD, Lifshits LM, Genito CJ, **Bachelder EM**, Ainslie KM. A predictive mechanistic model of drug release from surface eroding polymeric nanoparticles. J Control Release. 2022;351:883-95. Epub 2022/10/09.
25. Eckshtain-Levi M, Batty CJ, Lifshits LM, McCammitt B, Moore KM, Amouzougan EA, Stiepel RT, Duggan E, Ross TM, **Bachelder EM**, Ainslie KM. Metal-Organic Coordination Polymer for Delivery of a Subunit Broadly Acting Influenza Vaccine. ACS Appl Mater Interfaces. 2022;14(25):28548-58. Epub 2022/06/16.
26. Batty CJ, Gallovic MD, Williams J, Ross TM, **Bachelder EM**, Ainslie KM. Multiplexed electrospray enables high throughput production of cGAMP microparticles to serve as an adjuvant for a broadly acting influenza vaccine. Int J Pharm. 2022;622:121839. Epub 2022/05/28.
27. Gallovic MD, Junkins RD, Sandor AM, Pena ES, Sample CJ, Mason AK, Arwood LC, Sahm RA, **Bachelder EM**, Ainslie KM, Sempowski GD, Ting JP. STING agonist-containing microparticles improve seasonal influenza vaccine efficacy and durability in ferrets over standard adjuvant. J Control Release. 2022;347:356-68. Epub 2022/05/16.
28. Hendy DA, Amouzougan EA, Young IC, **Bachelder EM**, Ainslie KM. Nano/microparticle Formulations for Universal Influenza Vaccines. AAPS J. 2022;24(1):24. Epub 2022/01/09.
29. Varma DM, Batty CJ, Stiepel RT, Graham-Gurysh EG, Roque JA, 3rd, Pena ES, Hasan Zahid MS, Qiu K, Anselmo A, Hill DB, Ross TM, **Bachelder EM**, Ainslie KM. Development of an Intranasal Gel for the Delivery of a Broadly Acting Subunit Influenza Vaccine. ACS Biomater Sci Eng. 2022;8(4):1573-82. Epub 2022/03/31.
30. Varma DM, Redding EA, **Bachelder EM**, Ainslie KM. Nano- and Microformulations to Advance Therapies for Visceral Leishmaniasis. ACS Biomater Sci Eng. 2021;7(5):1725-41. Epub 2021/05/11.
31. Johnson BM, Uchimura T, Gallovic MD, Thamilarasan M, Chou WC, Gibson SA, Deng M, Tam JW, Batty CJ, Williams J, Matsushima GK, **Bachelder EM**, Ainslie KM, Markovic-Plese S, Ting JP. STING Agonist Mitigates Experimental Autoimmune Encephalomyelitis by Stimulating Type I IFN-Dependent and -Independent Immune-Regulatory Pathways. J Immunol. 2021;206(9):2015-28. Epub 2021/04/07.
32. Genito CJ, Batty CJ, **Bachelder EM**, Ainslie KM. Considerations for Size, Surface Charge, Polymer Degradation, Co-Delivery, and Manufacturability in the Development of Polymeric Particle Vaccines for Infectious Diseases. Adv Nanobiomed Res. 2021;1(3):2000041. Epub 2021/03/09.
33. Zahid MSH, Varma DM, Johnson MM, Landavazo A, **Bachelder EM**, Blough BE, Ainslie KM. Overcoming reduced antibiotic susceptibility in intracellular Salmonella enterica serovar Typhimurium using AR-12. FEMS Microbiol Lett. 2021;368(11). Epub 2021/06/06.
34. Batty CJ, **Bachelder EM**, Ainslie KM. Historical Perspective of Clinical Nano and Microparticle Formulations for Delivery of Therapeutics. Trends Mol Med. 2021;27(6):516-9. Epub 2021/04/28.
35. Stiepel RT, Batty CJ, MacRaild CA, Norton RS, **Bachelder E**, Ainslie KM. Merozoite surface protein 2 adsorbed onto acetalated dextran microparticles for malaria vaccination. Int J Pharm. 2021;593:120168. Epub 2020/12/15.
36. Batty CJ, Heise MT, **Bachelder EM**, Ainslie KM. Vaccine formulations in clinical development for the prevention of severe acute respiratory syndrome coronavirus 2 infection. Adv Drug Deliv Rev. 2021;169:168-89. Epub 2020/12/15.
37. Pena ES, Graham-Gurysh EG, **Bachelder EM**, Ainslie KM. Design of Biopolymer-Based Interstitial Therapies for the Treatment of Glioblastoma. Int J Mol Sci. 2021;22(23). Epub 2021/12/11.
38. Genito CJ, Eckshtain-Levi M, Piedra-Quintero ZL, Krovi SA, Kroboth A, Stiepel RT, Guerau-de-Arellano M, **Bachelder EM**, Ainslie KM. Dexamethasone and Fumaric Acid Ester Conjugate Synergistically Inhibits Inflammation and NF-kappaB in Macrophages. Bioconjug Chem. 2021;32(8):1629-40. Epub 2021/06/25.

39. Zahid MSH, Varma DM, Johnson MM, Landavazo A, **Bachelder EM**, Blough BE, KM. A. In Vitro Re-sensitization of Resistant Intracellular Salmonella enterica Serovar Typhimurium to Traditional Antibiotics with AR-12. FEMS Microbiol Lett. 2021;368(11):fnab062.
40. Moore KM, Batty CJ, Stiepel RT, Genito CJ, **Bachelder EM**, Ainslie KM. Injectable, Ribbon-Like Microconfetti Biopolymer Platform for Vaccine Applications. ACS Appl Mater Interfaces. 2020;12(35):38950-61. Epub 2020/08/19.
41. Varma DM, Zahid MSH, **Bachelder EM**, Ainslie KM. Formulation of host-targeted therapeutics against bacterial infections. Transl Res. 2020;220:98-113. Epub 2020/04/09.
42. Moore KM, Graham-Gurysh EG, Bomba HN, Murthy AB, **Bachelder EM**, Hingtgen SD, Ainslie KM. Impact of composite scaffold degradation rate on neural stem cell persistence in the glioblastoma surgical resection cavity. Mater Sci Eng C Mater Biol Appl. 2020;111:110846. Epub 2020/04/14.
43. Moore KM, Murthy AB, Graham-Gurysh EG, Hingtgen SD, **Bachelder EM**, Ainslie KM. Polymeric Biomaterial Scaffolds for Tumoricidal Stem Cell Glioblastoma Therapy. ACS Biomater Sci Eng. 2020;6(7):3762-77. Epub 2021/01/20.
44. Graham-Gurysh EG, Murthy AB, Moore KM, Hingtgen SD, **Bachelder EM**, Ainslie KM. Synergistic drug combinations for a precision medicine approach to interstitial glioblastoma therapy. J Control Release. 2020;323:282-92. Epub 2020/04/27.
45. Iweala OI, Choudhary SK, Addison CT, Batty CJ, Kapita CM, Amelio C, Schuyler AJ, Deng S, **Bachelder EM**, Ainslie KM, Savage PB, Brennan PJ, Commins SP. Glycolipid-mediated basophil activation in alpha-gal allergy. J Allergy Clin Immunol. 2020;146(2):450-2. Epub 2020/02/24.
46. Graham-Gurysh EG, Moore KM, Schorzman AN, Lee T, Zamboni WC, Hingtgen SD, **Bachelder EM**, Ainslie KM. Tumor Responsive and Tunable Polymeric Platform for Optimized Delivery of Paclitaxel to Treat Glioblastoma. ACS Appl Mater Interfaces. 2020;12(17):19345-56. Epub 2020/04/08.
47. Manaster AJ, Batty C, Tiet P, Ooi A, **Bachelder EM**, Ainslie KM, Broaders KE. Oxidation-Sensitive Dextran-Based Polymer with Improved Processability through Stable Boronic Ester Groups. ACS Appl Bio Mater. 2019;2(9):3755-62. Epub 2019/09/16.
48. Watkins-Schulz R, Tiet P, Gallovic MD, Junkins RD, Batty C, **Bachelder EM**, Ainslie KM, Ting JPY. A microparticle platform for STING-targeted immunotherapy enhances natural killer cell- and CD8(+) T cell-mediated anti-tumor immunity. Biomaterials. 2019;205:94-105. Epub 2019/03/26.
49. Steipel RT, Gallovic MD, Batty CJ, **Bachelder EM**, Ainslie KM. Electrospray for generation of drug delivery and vaccine particles applied in vitro and in vivo. Mater Sci Eng C Mater Biol Appl. 2019;105:110070. Epub 2019/09/25.
50. Zahid MSH, Johnson MM, Tokarski RJ, 2nd, Satoskar AR, Fuchs JR, **Bachelder EM**, Ainslie KM. Evaluation of synergy between host and pathogen-directed therapies against intracellular Leishmania donovani. Int J Parasitol Drugs Drug Resist. 2019;10:125-32. Epub 2019/09/08.
51. Chen N, Kroger CJ, Tisch RM, **Bachelder EM**, Ainslie KM. Prevention of Type 1 Diabetes with Acetalated Dextran Microparticles Containing Rapamycin and Pancreatic Peptide P31. Adv Healthc Mater. 2018;7(18):e1800341. Epub 2018/07/28.
52. Cheng N, Watkins-Schulz R, Junkins RD, David CN, Johnson BM, Montgomery SA, Peine KJ, Darr DB, Yuan H, McKinnon KP, Liu Q, Miao L, Huang L, **Bachelder EM**, Ainslie KM, Ting JP. A nanoparticle-incorporated STING activator enhances antitumor immunity in PD-L1-insensitive models of triple-negative breast cancer. JCI Insight. 2018;3(22). Epub 2018/11/16.
53. Chen N, Gallovic MD, Tiet P, Ting JP, Ainslie KM, **Bachelder EM**. Investigation of tunable acetalated dextran microparticle platform to optimize M2e-based influenza vaccine efficacy. J Control Release. 2018;289:114-24. Epub 2018/09/28.
54. Johnson MM, Collier MA, Hoang KV, Pino EN, Graham-Gurysh EG, Gallovic MD, Zahid MSH, Chen N, Schlesinger L, Gunn JS, **Bachelder EM**, Ainslie KM. In Vivo and Cellular Trafficking of Acetalated Dextran Microparticles for Delivery of a Host-Directed Therapy for Salmonella enterica Serovar Typhi Infection. Mol Pharm. 2018;15(11):5336-48. Epub 2018/10/09.
55. Collier MA, Junkins RD, Gallovic MD, Johnson BM, Johnson MM, Macintyre AN, Sempowski GD, **Bachelder EM**, Ting JP, Ainslie KM. Acetalated Dextran Microparticles for Codelivery of STING and TLR7/8 Agonists. Mol Pharm. 2018;15(11):4933-46. Epub 2018/10/04.
56. Chen N, Johnson MM, Collier MA, Gallovic MD, **Bachelder EM**, Ainslie KM. Tunable degradation of acetalated dextran microparticles enables controlled vaccine adjuvant and antigen delivery to modulate adaptive immune responses. J Control Release. 2018;273:147-59. Epub 2018/02/07.

57. Graham-Gurysh E, Moore KM, Satterlee AB, Sheets KT, Lin FC, **Bachelder EM**, Miller CR, Hingtgen SD, Ainslie KM. Sustained Delivery of Doxorubicin via Acetalated Dextran Scaffold Prevents Glioblastoma Recurrence after Surgical Resection. Mol Pharm. 2018;15(3):1309-18. Epub 2018/01/18.
58. Junkins RD, Gallovic MD, Johnson BM, Collier MA, Watkins-Schulz R, Cheng N, David CN, McGee CE, Sempowski GD, Shterev I, McKinnon K, **Bachelder EM**, Ainslie KM, Ting JP. A robust microparticle platform for a STING-targeted adjuvant that enhances both humoral and cellular immunity during vaccination. J Control Release. 2018;270:1-13. Epub 2017/11/25.
59. Krovi SA, Gallovic MD, Keller AM, Bhat M, Tiet P, Chen N, Collier MA, Gurysh EG, Pino EN, Johnson MM, Shamim Hasan Zahid M, Cottrell ML, Pirone JR, Kashuba AD, Kwiek JJ, **Bachelder EM**, Ainslie KM. Injectable long-acting human immunodeficiency virus antiretroviral prodrugs with improved pharmacokinetic profiles. Int J Pharm. 2018;552(1-2):371-7. Epub 2018/10/12.
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62. Webb LM, Amici SA, Jablonski KA, Savardekar H, Panfil AR, Li L, Zhou W, Peine K, Karkhanis V, **Bachelder EM**, Ainslie KM, Green PL, Li C, Baiocchi RA, Guerau-de-Arellano M. PRMT5-Selective Inhibitors Suppress Inflammatory T Cell Responses and Experimental Autoimmune Encephalomyelitis. J Immunol. 2017;198(4):1439-51. Epub 2017/01/15.
63. **Bachelder EM**, Pino EN, Ainslie KM. Acetalated Dextran: A Tunable and Acid-Labile Biopolymer with Facile Synthesis and a Range of Applications. Chem Rev. 2017;117(3):1915-26. Epub 2016/12/30.
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67. Gallovic MD, Schully KL, Bell MG, Elberson MA, Palmer JR, Darko CA, **Bachelder EM**, Wyslouzil BE, Keane-Myers AM, Ainslie KM. Acetalated Dextran Microparticulate Vaccine Formulated via Coaxial Electrospray Preserves Toxin Neutralization and Enhances Murine Survival Following Inhalational Bacillus Anthracis Exposure. Adv Healthc Mater. 2016;5(20):2617-27. Epub 2016/10/27.
68. Gallovic MD, Montjoy DG, Collier MA, Do C, Wyslouzil BE, **Bachelder EM**, Ainslie KM. Chemically modified inulin microparticles serving dual function as a protein antigen delivery vehicle and immunostimulatory adjuvant. Biomater Sci. 2016;4(3):483-93. Epub 2016/01/12.
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AR. A Novel Sterol Isolated from a Plant Used by Mayan Traditional Healers Is Effective in Treatment of Visceral Leishmaniasis Caused by Leishmania donovani. ACS Infect Dis. 2015;1(10):497-506. Epub 2016/09/14.
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83. Duong AD, Sharma S, Peine KJ, Gupta G, Satoskar AR, **Bachelder EM**, Wyslouzil BE, Ainslie KM. Electrospray encapsulation of toll-like receptor agonist resiquimod in polymer microparticles for the treatment of visceral leishmaniasis. Mol Pharm. 2013;10(3):1045-55. Epub 2013/01/17.
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87. Kauffman KJ, Kanthamneni N, Meenach SA, Pierson BC, **Bachelder EM**, Ainslie KM. Optimization of rapamycin-loaded acetalated dextran microparticles for immunosuppression. Int J Pharm. 2012;422(1-2):356-63. Epub 2011/11/01.
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89. Kauffman KJ, Do C, Sharma S, Gallovic MD, **Bachelder EM**, Ainslie KM. Synthesis and characterization of acetalated dextran polymer and microparticles with ethanol as a degradation product. ACS Appl Mater Interfaces. 2012;4(8):4149-55. Epub 2012/07/27.
90. **Bachelder EM**, Beaudette TT, Broaders KE, Frechet JM, Albrecht MT, Mateczun AJ, Ainslie KM, Pesce JT, Keane-Myers AM. In vitro analysis of acetalated dextran microparticles as a potent delivery platform for vaccine adjuvants. Mol Pharm. 2010;7(3):826-35. Epub 2010/03/17.
91. Cohen JA, Beaudette TT, Cohen JL, Broaders KE, **Bachelder EM**, Frechet JM. Acetal-modified dextran microparticles with controlled degradation kinetics and surface functionality for gene delivery in phagocytic and non-phagocytic cells. Adv Mater. 2010;22(32):3593-7. Epub 2010/06/03.

92. Beaudette TT, **Bachelder EM**, Cohen JA, Obermeyer AC, Broaders KE, Frechet JM, Kang ES, Mende I, Tseng WW, Davidson MG, Engleman EG. In vivo studies on the effect of co-encapsulation of CpG DNA and antigen in acid-degradable microparticle vaccines. Mol Pharm. 2009;6(4):1160-9. Epub 2009/05/07.
93. Cohen JA, Beaudette TT, Tseng WW, **Bachelder EM**, Mende I, Engleman EG, Frechet JM. T-cell activation by antigen-loaded pH-sensitive hydrogel particles in vivo: the effect of particle size. Bioconjug Chem. 2009;20(1):111-9. Epub 2008/12/24.
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98. **Bachelder EM**, Beaudette TT, Broaders KE, Dashe J, Frechet JM. Acetal-derivatized dextran: an acid-responsive biodegradable material for therapeutic applications. J Am Chem Soc. 2008;130(32):10494-5. Epub 2008/07/18.
99. Paramonov SE, **Bachelder EM**, Beaudette TT, Standley SM, Lee CC, Dashe J, Frechet JM. Fully acid-degradable biocompatible polyacetal microparticles for drug delivery. Bioconjug Chem. 2008;19(4):911-9. Epub 2008/04/01.
100. Ainslie KM, **Bachelder EM**, Borkar S, Zahr AS, Sen A, Badding JV, Pishko MV. Cell adhesion on nanofibrous polytetrafluoroethylene (nPTFE). Langmuir. 2007;23(2):747-54. Epub 2007/01/11.
101. Lee KS, Scanga CA, **Bachelder EM**, Chen Q, Snapper CM. TLR2 synergizes with both TLR4 and TLR9 for induction of the MyD88-dependent splenic cytokine and chemokine response to Streptococcus pneumoniae. Cell Immunol. 2007;245(2):103-10. Epub 2007/05/25.
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103. **Bachelder EM**, Ainslie KM, Pishko MV. Utilizing a quartz crystal microbalance for quantifying CD4(+) T cell counts. Sensor Letters. 2005;3(3):211-5.
104. Alpan O, **Bachelder E**, Isil E, Arnheiter H, Matzinger P. 'Educated' dendritic cells act as messengers from memory to naive T helper cells. Nat Immunol. 2004;5(6):615-22. Epub 2004/05/25.

## NON-PEER REVIEWED ARTICLES

1. Pena ES, Bachelder EB, Ainslie KM. Acetalated Dextran for Enhanced Delivery of Subunit Vaccines. In: Patravale VB, editor. Nineteenth International e-Symposium: Advances in Technology & Business Potential of New Drug Delivery Systems; February; Online: Controlled Release Society Indian Chapter 2021.

## BOOK CHAPTERS

1. Stiepel RT, Woodring RN, Middleton DD, **Bachelder EM**, Ainslie KM. Translational Landscape of Immuno-Engineered Technologies. In: Fundamentals of Immune Engineering. Submitted 2022.
2. Graham-Gurysh EG, Carpenter BW, Beck WA, Varma DM, Vincent BG, **Bachelder EM**, Ainslie KM. Delivery Strategies for Cancer Vaccines and Immunoadjuvants. In: Mansoor Amiji M, editor. Delivery Strategies in Immuno-Oncology: Elsevier; 2021
3. Peine KJ, Chen N, **Bachelder EM**, Ainslie KM. Drug Delivery Strategies for Tolergenic Therapy For Autoimmune Diseases in an Antigen Specific Manner. In: Keservani R, editor. Recent Advances in Drug Delivery Technology. Hershey, PA: IGI Global; 2017.
4. Gallovic MD, **Bachelder EM**, Ainslie KM. Immunostimulatory Inulin Adjuvants in Prophylactic Vaccines Against Pathogens. In: Davis CR, editor. Inulin: Chemical Properties, Uses and Health Benefits: Nova Science Publishers; 2017.
5. Chen N, Peine KJ, **Bachelder EM,** Ainslie KM. Micro- and Nano-particulate Strategies for Antigen Specific Immune Tolerance to Treat Autoimmune Diseases. Pharmaceutical Nanotechnology, 3(2): 85-100. 2016

## PATENTS

1. Jean M.J. Frechet, **Eric M. Bachelder**, Tristan T. Beaudette, Kyle E. Broaders *"*Acid-Degradable and Bioerodible Modified Polyhydroxylated Materials*"* Priority date 2006-03-24WO2010005847
2. **Eric M. Bachelder**, James R. Fuchs, Angelica P. Isaac-Marquez, Alan Douglas Kinghorn, Claudio M. Lezama-Davila, Li Pan, Abhay R. Satoskar, "Antileishmanial compositions and methods." WO2012145734 A1. Priority date 2011-04-22
3. Larry Schlesinger, **Eric Bachelder**, Fred Cope "Compositions for targeting macrophages and other CD206 high expressing cells and methods of treating and diagnosis." Priority date 2014-07-17 US20170209584A1
4. Kristy Ainslie, **Eric Bachelder**, Shalini Gautam, Kevin Peine, Abhay Satoskar "Compositions and methods for inhibiting leishmania." Priority date 2014-10-30 US20160120844A1
5. Larry Schlesinger, **Eric Bachelder**, Fred Cope, "Compounds and compositions for targeting macrophages and other mannose-binding c-type lectin receptor high expressing cells and methods of treating and diagnosis using same." Pub. Date: Jul. 20, 2017 WO2016011415A2
6. Ting JPY, Junkins R, Johnson B, Ainslie KM, **Bachelder EM**, Gallovic MD, Collier MA, Cheng N. Methods and Compositions for Inducing An Immune Response. Application Number: US11052149B2. 2021-07-06.
7. Bachelder EM, Ainslie KM, Batty CJ, Levi ME, Lifshits L. Bio-Inspired Metal Organic Polymer For Drug And Vaccine Delivery. PCT/US2023/015745. July 2023.

## SERVICE TO COMPANIES

2012 - 2014 Scientific Advisory Board Member, Peptineo, Albuquerque, NM
2017 Co-Founder IMMvention Therapeutix (Inflammasome Company), Durham, NC
   i. One of three scientific founders of Immunological therapy company.
   ii. Left after helping secure $3.9 Million in venture capital in December 2020.
2017 - 2020 Scientific Advisory Board Member, IMMvention Therapeutix, Durham, NC
2017-2020 Board of Directors, IMMvention Therapeutix, Durham, NC
2023 Advisor to Shaperon Inc.

## TEACHING

**Autumn 2010**

- The Ohio State University, Biomedical Science. Special Topics in Biomedical Science: Immunology And Infectious Disease 581. 2 credit hours (1 class)

**Every Autumn 2010-2014**.

- The Ohio State University, Pharmacy. Drug Transport Q:804/S:8040. 3 credit hours (2 classes)
- The Ohio State University, Pharmacy. Introduction to Clinical Immunology Q:710/S:7100. 2 credit hours (2 classes)

**Every Winter quarter/Spring semester 2010-2014**.

- The Ohio State University, Pharmacy. Drug Delivery II Q:622/S:6220. 3 credit hours (2 classes)
- The Ohio State University, Microbiology. Immunology Q:522/S:5220. 3 credit hours (1 class)

## SERVICE TO PROFESSIONAL PUBLICATIONS

**Journal Reviewer**: Nature Materials, JACS, Biomacromolecules. Molecular Pharmaceutics, Journal of Controlled Release, International Journal of Pharmaceutics, Pharmaceutical Research

## SERVICE TO REVIEW PANELS

- Review of JDRF grants 2016
- Special Emphasis Panel/Scientific Review Group 2022/10 ZRG1 AIDC-S (02) M meeting. (NIH) July 15,2022
- Special Emphasis Panel/ Center for Scientific Review Special Emphasis Panel CENTER FOR SCIENTIFIC REVIEW ZRG1 DCAI-U Member Conflict: Topics in Disease Control and Applied Immunology Agenda Seq Num - 481498 07/14/2023

## SERVICE TO SOCIETIES

- Kidney Foundation Symposium on developing recommendations on vaccination for patients with chronic kidney disease. November 2022.

## AWARDS

**Fellowship Award for Research Excellence (FARE)** 2004 & 2005

- Awarded to best research performed on the NIH campuses.

- Traditionally given to postdoctoral candidates.
- Selected from over 1,000 candidates.
- Only thirty candidates have won two years in a row.

**Pre-doctoral Fellow - Intramural Research Training Award (IRTA)** 2001 - 2006

- Fellowship provides funding for graduate research done at the NIH.

**Michigan State University College of Engineering Graduation Commencement Speaker** 1999

## PRESENTATIONS

**Invited Intramural**

1. **Bachelder EM**, Presenter. 2009. Acid-Labile Biomaterials for Immunotherapeutic Applications. to Pharmaceutics Division. OSU. Columbus, OH. (November 8)
2. **Bachelder EM**, Seminar Presenter. 2009. Novel Polymeric Carriers for Immune Modulation. to Whiticare/Racke/Lovett-Racke Neuroimmunology Lab Meeting. OSU. Columbus, OH. (December 6)
3. **Bachelder EM**, Seminar Presenter. 2010. Acid-Labile Biomaterials for Immunotherapeutic Applications. to Chemistry. OSU. Columbus, OH. (February 4)
4. **Bachelder EM**, Seminar Presenter. 2010. Acid-Labile Biomaterials for Immunotherapeutic Applications. to CMIB Work in Progress. OSU. Columubs, OH. (April 5)
5. **Bachelder EM**, Seminar Presenter. 2011. Novel Polymeric Carriers for Immune Modulation. to Hadley Group Meeting. OSU. Columbus, OH. (January 6)
6. **Bachelder EM**, Presenter. 2011. Novel Polymeric Carriers for Immune Modulation. to Immunology Roundtable. OSU. Columbus, OH. (April 27)

**Extramural**

1. **Bachelder EM,** Acetalated Dextran: A spoonful of sugar helps the medicine (and vaccines) go down!, Howard University, 2021.
2. **Bachelder EM,** Formulation of a Universal Flu Vaccine. Pharmalliance. Monash University, Melbourne AUS 2019.
3. **Bachelder EM,** Invited Seminar. (2015) "Natural product treatment for visceral *Leishmaniasis*" DOD Military Health System Research Symposium
4. **Bachelder EM**, Invited Seminar. (2013) "Acetalated Dextran: Vaccination methods for immunotolerance" Novartis, Boston, MA.
5. **Bachelder EM**, Invited Seminar. (2013) "Acetalated dextran particles for the treatment of Multiple Sclerosis." JDRF FOCIS, Boston, MA.
6. **Bachelder EM**, Poster Presenter. 2013 "Acetalated dextran particles for the treatment of Multiple Sclerosis." FOCIS, Boston, MA.
7. **Bachelder EM**, Poster Presenter. 2013 "Acetalated dextran particles for the treatment of Multiple Sclerosis." FOCIS, Boston, MA.
8. Schully K, Sharma S, Pesce JT, **Bachelder EM**, Keane-Myers A, Ainslie KM. Poster Presenter. 2011 "Encapsulated Francisella novicida Lysate Confers Protection From High Dose Challenge in BALB/c Mice." Chemical and Biological Defense Science and Technology Conference, Las Vegas NV.
9. **Bachelder EM**, Poster Presenter. 2011. Novel Polymeric System for Rapid Vaccination Novel Polymeric System for Rapid Vaccination. Presented at Gordon Research Conference: Chemical & Biological Terrorism Defense. Ventura Beach Marriott. Ventura, CA. (February 20 - 25) [Peer Reviewed]
10. **Bachelder EM**, Invited Seminar. (2009) "Acetal-Derivatized Dextran: An Acid-Responsive Biodegradable Material for Therapeutic Applications." Cleveland Clinic, Department of Biomedical Engineering.
11. **Bachelder EM,** Invited Seminar. (2009) "Acetal-Derivatized Dextran: An Acid-Responsive Biodegradable Material for Therapeutic Applications." University of Akron, Department of Chemical Engineering.
12. **Bachelder EM,** Invited Seminar. (2009) "Acetal-Derivatized Dextran: An Acid-Responsive Biodegradable Material for Therapeutic Applications." University of Cincinnati, Division of Pharmaceutics.
13. **Bachelder EM,** Invited Seminar. (2009) "Acetal-Derivatized Dextran: An Acid-Responsive Biodegradable Material for Therapeutic Applications." University of Wisconsin, Division of Pharmaceutics.

14. **Bachelder EM**, Beaudette TT, Broaders KE, Dashe J, Fréchet JM. (2008) "Acetal-Derivatized Dextran: An Acid-Responsive Biodegradable Material for Therapeutic Applications." American Institute of Chemical Engineers National Meeting, Philadelphia, Pennsylvania.
15. **Bachelder EM**, Ainslie KM, Pishko MV. (2004) "Quartz Crystal Microbalance used for counting CD4+ T cells" American Institute of Chemical Engineers National Meeting, Austin, TX.
16. **Bachelder EM**, Matzinger P, Velander W. (2004) "Oral Delivery FIX" American Institute of Chemical Engineers National Meeting, Austin, TX.

## EMPLOYMENT HISTORY (non-research employment)

**Virginia Polytechnic and State University** 5/2001 – 8/2001
Teaching Assistant Instructor: Preston Durill

- Instructor for Unit Operations course.
- Designed projects for students to learn and understand core engineering operations.
- Graded and evaluated student write-ups and presentations.

**Virginia Polytechnic and State University** 8/2000 – 5/2001
Teaching Assistant Instructor: Prof. William Velander

- Taught four lectures focused on fundamental mass transfer topics.
- Developed and taught curriculum for a lecture based on components of mass transfer.
- Graded quizzes and examinations.

**HalsoSalt™** 1999 –2000
Engineer

- Product Processing and Development.
- Sales and Customer Relations.

**Pharmacia & Upjohn (Pfizer)** 5/1997 – 12/1997
Professional Intern Quality Control Laboratory

- Analyzed potency and purity of steroid and specialty chemicals by HPLC.
- Familiar with GMP and FDA regulations along with various compendial assays for Active Pharmaceutical Ingredients.
- Evaluated compendial method changes as well as initiated improvements with established methods.
- Exposure to pharmaceutical production.

## GRADUATE COMMITTEE

Current: Mairead Heavy, Natalie Jasiewicz, Cole Batty, Rebeca Stiepel, Erik Pena, Dylan Hendy, Ryan Woodring, Nicole Lukush.
Previous: Sara Musetti, Chris Genito, Katherine Moore, Naihan Chen, Michael Collier, Kevin Peine.

## GRANTS

NIH (Ting/**Bachelder**)
R01AI141333-01 12/14/2018 – 11/30/2024 $6,054,843
**Micro-Particle Delivery of a Potent Intracelluar Adjuvant for a Universal Flu Vaccine**
This proposal plans to use a unique microparticle formulation to deliver adjuvants comprised of pathogen-associated molecules to activate the immune system. We propose that such an activated immune system will aid in vaccine responses to emerging viruses of urgent health impact.

NIH (Ainslie) 7/1/2018-6/30/2024 $1,891,998
R01AI137525-01A1
**Biomaterials to study tolerance immune induction kinetics**
We will use the unique degradation rates of acetalated dextran to understand the kinetics of dendritic and T cell interactions as it relates to tolerance.

NIH (Ainslie)
5R01AI125147-02 4/22/2016 – 3/31/2022 $5,961,014

**Host Targeted Therapy for Drug Resistant Salmonella and Francisella infection**
We propose the optimization of a host targeted therapeutic for the treatment of infection due to drug resistant bacteria. We will alter the chemical structure and formulate the drug to increase the efficacy of the compound. We will perform experiments that will help enable IND FDA filling of the proposed therapy.

University of Georgia/NIH (Ainslie)
Contract No. 75N93019C00052 9/16/2019 - 8/31/2026 $1,687,861
**Center for Influenza Vaccine Research in High Risk Populations (CIVICs)**
Our proposed research plan will converge human vaccine assessment with currently commercial vaccines in populations that are under-represented in many vaccine trials and compared results in match animal models to assess the effectiveness of universal vaccine formulations developed in the CIVR-HRP.

NIH (Ainslie)
1R01AI147497-01A1 01/14/2020 - 1/13/2025 $2,919,766
**Optimizing a Universal Influenza Subunit Nano/Microparticulate Vaccine**
Our goal is to formulate computer generated influenza antigens (COBRA antigens) into degradable biopolymeric (Ac-DEX) nanoparticles to improve the vaccine's efficacy by co-delivering immune activating adjuvants.

NIH (Ainslie)
1R01DK130225-01 7/1/2021 – 6/30/2025 $1,526,836
**Formulation to Generate Tolerance Towards Type 1 Diabetes**
Antigen specific tolerance towards type-1 (insulin dependent) diabetes can provide a long-term cure for the disease without the need for administration of exogenous insulin. We propose the use of microparticles to reprogram the immune system's response against the islet cells by creating antigen specific tolerance to mitigate the harmful autoimmune response

NIH (Ainslie)
1R01CA257009-01A1 8/1/2021 – 7/31/2026 $1,797,170
**Tunable Temporal Drug Release for Optimized Synergistic Combination Therapy of Glioblastoma** Glioblastoma is a devastating brain cancer that needs new treatment options because even with chemotherapy, radiation, and surgical resection, tumor recurrence almost always leads to death. Here we propose synergistic combination therapy that relies on optimized elution of chemotherapeutics from a nanofibrous controlled-release scaffold placed in the brain at time of surgery to remove the tumor.

NIH (Ainslie)
R01AI167099 1/01/2023 - 12/31/2028 $3,231,335
**Mechanistic evaluation of mast cell agonists combined with TLR, NOD and STING agonists**
Adjuvants are used to promote immune responses and formulate efficacious vaccines. Here we evaluate adjuvant combinations with mast cell agonists, evaluate it as a vaccine against an animal model of smallpox and evaluate its mechanism of action. **Percentile score: 1**

**Completed**
NIH (Hingtgen)
5R01NS097507-02 6/1/2016 – 5/31/2022 $1,628,896
**Nanofiber matrices to improve neural stem cell-mediated cancer therapy**
This proposal seeks to define the design cues that are essential for polymeric scaffolds to improve tNSC therapy, and determine the efficacy of novel polymeric scaffolds capable of maximizing cytotoxic tNSC treatment of surgically resected GBM.

Grant # (PI: Ainslie) 01/01/2019 - 7/31/2019 $125,187
Duke University / NIH
**Adjuvant Discovery Program**

NIH (Bachelder) 07/16-06/18 $275,000
"U19 Supplement: Novel Nanoparticle Platform for the Delivery of Vaccines"
This is work for developing an influenza vaccine.

NIH (Ainslie) 04/16-03/18 $423,739
"Microparticle resiquimod for the treatment of visceral leishmaniasis"
This is work to treat visceral leishmaniasis with resiquimod.

NIH (Ainslie) 07/12-06/17 0.6 calendar $928,000
"Celecoxib Derivative: Host Cell-Directed Inhibitors of Intracellular Pathogens"
The goal of this project is to develop a treatment against bioterrorism agents using the Celecoxib Derivative, AR-12.

DOD (Satoskar) 09/14-09/17 0.42 calendar $848,354
Formulation of lead compounds at 10, 15 and 20% from the PEN and DNER analogue library into white soft paraffin with 10% urea to treat CL ipan a mouse model, for in vivo testing at OSU.

OSU PHPID (Ibba) 10/13-9/15 $50,000
"A Systems Biology Approach to Drug Target Discovery for Leishmaniasis"

JDRF (Bachelder) 09/12-08/15 3.0 calendar $395,454
NIH
"Tolergenic Nanoparticle Vaccine for the Treatment of Type 1 Diabetes"
The goal of this project is to treat Type 1 Diabetes using microparticles encapsulating rapamycin.

NIH (Popovich) 09/12-08/14 0.6 calendar $275,000
R21
"miRNA Regulation of Macrophages after Spinal Cord Injury."
The specific aim that our lab will be working on is the targeting of macrophages with nanoparticles in the spinal cord.

NIH (Papenfuss) 7/12-6/14 1.2mos $275,000
NIH/NIAID
"Regulatory myeloid cells in inflammatory disease: Therapy and targeted generation with micro particles"

1R21NS072813-01A1 (Ainslie) 7/11-6/14 3.6 calendar $275,000
NIH/NINDS
"Encapsulated active vitamin D vaccine for the treatment of multiple sclerosis."
The major goal of this project is to develop a vaccine to treat multiple sclerosis using microparticles encapsulating vitamin D.

DTRA (Ainslie) 9/12-07/14 0.6 calendar $3,426,677
DTRA/DOD
"Development of needle-free, multi-formulation nanoparticle vaccine."
The major goal of this project is to develop a needle free vaccine for bioterrorism agents.

Arno (Schlesinger) 7/13-9/14 $200,000
"Evaluation and encapsulation of AR-12 compound"

Arno Therapeutics (Bachelder) 10/13-9/14 $7,500
"AR-12 for the treatment of visceral leishmaniasis"

BAA-09-43 (Ainslie) 9/10-9/12 0.6 calendar
DOD/DARPA $1,176,660
"Universal vaccine microparticulate carrier that encapsulates immune modifiers and antigens in a novel polymeric matrix to passively target dendritic cells."

Defense Threat Reduction Agency Site PI (Bachelder) 9/09-9/10 6 mos
"Stimulation of broad spectrum protection via TLR 7,8&9" $96,959

R01GM066115 (Cook) 07/11-06/13 1.2 calendar
NIH $1,250,000

“Bacterial sepsis and Reactivation of Latent Cytomegalovirus”
The specific aim that I will be working on in this project is the encapsulation of a peptide that is associated with cytomegalovirus for vaccine applications.