

## ANDREA A. JOSEPH

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### I. EDUCATION

Icahn School of Medicine at Mount Sinai, New York City, NY

Postdoctoral Researcher, Department of Obstetrics, Gynecology, and Reproductive Sciences

March 27, 2023—present

University of Pennsylvania, Philadelphia, PA

Postdoctoral Researcher, Center for Research on Reproduction & Women's Health

June 21, 2021—March 31, 2023

University of Washington, Seattle, WA

Ph.D. Chemical Engineering, awarded June 12, 2021

Thesis title: Biodegradable polymeric nanoparticles for the treatment of neonatal brain injury

Johns Hopkins University, Baltimore, MD

B.S. Chemical and Biomolecular Engineering, awarded May 18, 2016

### II. HONORS and AWARDS

2023	Robin Chemers Neustein Postdoctoral Fellowship, Icahn School of Medicine at Mount Sinai
2023	President's Plenary Award, Society for Reproductive Investigation
2022	Travel Award, Biomedical Postdoctoral Programs at the University of Pennsylvania
2022	Kumar Memorial Lecture Award, Biomedical Postdoctoral Council at the University of Pennsylvania
2021	Outstanding Women in Innovation Award, Society of Women Engineers at University of Washington
2020	Faculty Lecture Award, University of Washington Chemical Engineering
2020	High Impact Publication Award, University of Washington Chemical Engineering
2020	Krieger-Brockett Travel Award, University of Washington Chemical Engineering
2020	AICHE Biomaterials Graduate Student Award Session (Finalist)
2020	Collegiate Rapid Fire Competition, 2 <sup>nd</sup> place, Society of Women Engineers
2020	Schmidt Science Fellowship Nominee, University of Washington
2020	Husky 100 Awardee, University of Washington
2019	Graduate School Conference Travel Award, University of Washington
2019	NIH Training Course in Neurotherapeutics Discovery and Development Attendee
2018-2021	NIH F31 Fellow (8 <sup>th</sup> percentile)
2018	Travel Grant, UW Graduate & Professional Student Senate
2017	National Science Foundation Graduate Research Fellowship Honorable Mention
2016	Runstad Family Endowed Fellowship Recipient
2016	Centennial Conference Champions, Johns Hopkins University Varsity Tennis
2013-2016	Engineering Dean's List, Johns Hopkins University
2013-2016	Thomas J. Watson Memorial Scholarship

### III. PUBLICATIONS (\*Co-first; Corresponding)

1. **A. Joseph**, E. Lewis, B. Ferguson, Y. Guan, L. Anton, and M. Elovitz. Intrauterine colonization with *Gardnerella vaginalis* and *Mobiluncus mulieris* induces maternal inflammation but not preterm birth in a mouse model, *American Journal of Reproductive Immunology*. (2023)

2. **A. Joseph** and E. Nance. Nanotherapeutics and the Brain, *Annual Review of Chemical and Biomolecular Engineering*. (2022)
3. **A. Joseph**, G. Simo, T. Gao, N. Alhindi, N. Xu, D. Graham, L. Gamble, **E. Nance**. Surfactants influence polymer nanoparticle fate in the brain, *Biomaterials*. (2021)
4. **A. Joseph**, C. Nyambura, D. Bondurant, K. Corry, D. Beebout, T. Wood, J. Pfaendtner, **E. Nance**. Formulation and efficacy of catalase-loaded nanoparticles for the treatment of neonatal hypoxic-ischemic encephalopathy, *Pharmaceutics*. (2021)
5. H. Helmbrecht, **A. Joseph**, M. McKenna, M. Zhang, **E. Nance**. Governing Transport Principles for Nanotherapeutic Application in the Brain, *Current Opinions in Chemical Engineering*. (2020)
6. **A. Joseph\***, R. Liao\*, M. Zhang, H. Helmbrecht, M. McKenna, J. Filteau, **E. Nance**. Nanoparticle-microglial interaction in the ischemic brain is modulated by injury duration and treatment, *Bioengineering & Translational Medicine*. (2020)
7. V. Yellepeddi, **A. Joseph**, **E. Nance**. Pharmacokinetics of Nanotechnology-Based Formulations in Pediatric Populations, *Advanced Drug Delivery Reviews*. (2019)
8. **A. Joseph**, T. Wood, C. Chen, K. Corry, J. Snyder, S. Juul, P. Parikh, **E. Nance**. Curcumin-loaded polymeric nanoparticles for neuroprotection in neonatal rats with hypoxic ischemic encephalopathy, *Nano Research*. (2018)
9. J. Smith\*, K. G. Sprenger\*, R. Liao, **A. Joseph**, E. Nance, **J. Pfaendtner**, Determining Dominant Driving Forces Affecting Controlled Protein Release from Polymeric Nanoparticles, *Biointerphases*. (2017)
10. G. Duncan, J. Jung, **A. Joseph**, A. Thaxton, N. West, M. Boyle, **J. Hanes**, **J. S. Suk**, Microstructural alterations of Sputum in Cystic Fibrosis Lung Disease, *JCI Insight*. (2016)

#### *Report of Invention/ Provisional Patent*

1. E. Nance, **A. Joseph**, C. Nyambura, J. Pfaendtner, T. Wood. Formulation and efficacy of enzyme-loaded polymeric nanoparticles. Provisional Patent Application 63/221,827, filed 7/14/2021

#### **IV. PRESENTATIONS** (\*Presenting author)

##### *Oral presentations*

1. **A. Joseph\***, L. Anton, B. Ferguson, Y. Guan, M. Elovitz. Vaginal Microbe-Derived Extracellular Vesicles Uptake into Cervicovaginal Epithelial Cells and Deliver Bacterial Cargo. *Society for Reproductive Investigation Annual Meeting*. Brisbane, Australia. (March 23, 2023; invited talk)
2. **A. Joseph\***, L. Anton, B. Ferguson, Y. Guan, M. Elovitz. Bacterial extracellular vesicles mediate host-microbe communication in the cervicovaginal space. *Vincent Center for Reproductive Biology Seminar Series*. Boston, MA; virtual. (November 1, 2022; invited talk)
3. **A. Joseph\***, L. Anton, B. Ferguson, M. Elovitz. Extracellular vesicles from *Gardnerella vaginalis* and *Mobiluncus mulieris* induce host immune responses from the cervicovaginal epithelium. *Controlled Release Society Annual Meeting*. Montreal, Canada. (July 13, 2022)
4. **A. Joseph\***, M. Elovitz. *In vivo* investigation of the vaginal microbiome and spontaneous preterm birth. *Center for Research on Reproductive and Women's Health seminar series*. Philadelphia, PA. (May 4, 2022)
5. **A. Joseph\***, M. Elovitz. Kumar Memorial Lecture Award: Uterine colonization with pathogenic vaginal microbes is insufficient to cause preterm birth. *Biomedical Postdoctoral Council Symposium*. Philadelphia, PA. (April 1, 2022; invited talk)
6. **A. Joseph\***, L. Anton, B. Ferguson, M. Elovitz. Extracellular vesicles from *Gardnerella vaginalis* and *Mobiluncus mulieris* induce host immune responses from the cervicovaginal epithelium. *Society for Reproductive Investigation Annual Meeting*. Denver, CO. (March 17, 2022)
7. **A. Joseph\***, G. Bondurant, A. Rios, D. Beebout, E. Nance. Catalase-loaded polymeric nanoparticles for neuroprotection after hypoxic-ischemic injury. *Controlled Release Society Annual Meeting*. Montreal, Canada; Virtual. (July 25, 2021)

8. **A. Joseph\***, E. Nance. Faculty Lecture Award: Engineering nanotherapeutics for neonatal brain injury. *UW Chemical Engineering Departmental Seminar*. Seattle, WA. (November 23, 2020)
9. **A. Joseph\***, G. Simo, T. Gao, N. Alhindi, E. Nance. Graduate Student Award Session: Surfactant effects on nanotherapeutic fate within the brain. *AIChE Annual Meeting*. San Francisco, CA; Virtual. (November 17, 2020)
10. J. Filteau\*, R. Liao, **A. Joseph**, E. Nance. Organotypic brain slices as a platform for measuring response to biological stimuli. *AIChE Annual Meeting*. San Francisco, CA; Virtual. (November 16, 2020)
11. E. Nance\*, **A. Joseph**, R. Liao, K. Hildahl. Engineering nanomedicine to overcome biological barriers for improved treatment of pediatric brain diseases. *AIChE Annual Meeting*. San Francisco, CA; Virtual. (November 16, 2020) \*Invited Plenary
12. **A. Joseph\***, E. Nance. Collegiate Awards Session: Can nanoparticles treat brain disease? *Society of Women Engineers Annual Meeting*. New Orleans, LA; Virtual. (November 6, 2020)
13. E. Nance\*, M. McKenna, C. Curtis, R. Liao, **A. Joseph**. Nanotechnology-based probes of structure-function in living tissue. *Clemson University Department of Chemical Engineering seminar series*. Clemson, SC; Virtual. (Sept 11, 2020)
14. A. Rios\*, **A. Joseph**, E. Nance. Nanoparticle Delivery of Protein Therapeutics to Treat Neuronal Death in Hypoxic Ischemic Encephalopathy. *UW Undergraduate Research Symposium*. Seattle, WA; Virtual. (August 19, 2020)
15. **A. Joseph\***, E. Nance. Can nanoparticles treat brain disease? *Town Hall Science Speaker Series*. Seattle, WA; Virtual. (June 15, 2020)
16. E. Nance\*, M. McKenna, C. Curtis, R. Liao, **A. Joseph**. Nanotechnology-based probes of structure-function in living tissue. *Johns Hopkins University School of Pharmacy Seminar Series*. Baltimore, MD. (January 8, 2020)
17. **A. Joseph\***, G. Simo, T. Gao, E. Nance. Effect of surfactant size and structure on biodegradable nanoparticle interaction with the brain microenvironment. *Society for Biomaterials UW Chapter Biomaterials Day*. Seattle, WA. (December 10, 2019)
18. E. Nance\*, M. McKenna, C. Curtis, R. Liao, **A. Joseph**. Nanotechnology-based probes of structure-function in living tissue. *AIChE Annual Meeting*. Orlando, FL. (November 12, 2019) \*Invited Plenary
19. **A. Joseph\***, E. Nance. Nanoparticle design for drug delivery to the neonatal brain. *Graduate Student Symposium*. Seattle, WA. (September 19, 2019)
20. R. Liao, **A. Joseph**, T. Wood, S. Juul, E. Nance\*. Nanotherapeutic modulation of inflammation and oxidative stress in neonatal brain injury. *Distinguished Lecture Series in Cardiovascular Medicine*. Seattle, WA. (January 21, 2019)
21. **A. Joseph**, R. Liao, K. Corry, T. Wood, S. Juul, P. Parikh, E. Nance\*. Nanotherapeutics for neuroprotection in the developing brain. *AIChE Annual Meeting*. Pittsburgh, PA. (October 29, 2018)
22. M. McKenna, C. Curtis, **A. Joseph**, R. Liao, E. Nance\*. Nanotherapeutics for neuroprotection in the injured brain. *University of Colorado Department of Chemical and Biological Engineering*. Boulder, CO. (October 11, 2018)
23. **A. Joseph**, R. Liao, E. Nance\*. Nanotherapeutics for neuroprotection in the injured perinatal brain. *Houston Methodist Department of Nanomedicine Seminar Series*. Houston, TX. (July 27, 2018)
24. **A. Joseph**, T. Wood, C. Chen, K. Corry, J. Snyder, S. Juul, P. Parikh, E. Nance\*. Curcumin-loaded polymeric nanoparticles for the treatment of neonatal hypoxic-ischemic encephalopathy. *Pediatric Academic Societies Annual Meeting*. Toronto, Canada. (May 6, 2018)
25. C. Curtis, M. McKenna, **A. Joseph**, R. Liao, E. Nance\*. Nano-based probes of the diseased brain: directing therapeutic intervention. *BioNanoMed Annual Meeting*. Graz, Austria. (April 26, 2018)
26. **A. Joseph\***, T. Wood, C. Chen, K. Corry, J. Snyder, S. Juul, P. Parikh, E. Nance. Curcumin-loaded brain penetrating nanoparticles for the treatment of neonatal brain injury. *UW Biomaterials Seminar Series*. Seattle, WA. (March 8, 2018)
27. M. Mallya\*, **A. Joseph**, E. Nance. The Evaluation of Various Surfactants on PLGA and PLGA-PEG Nanoparticles. *STEMM Prep Symposium*. Seattle, WA. (August 11, 2017)

*Poster presentations*

28. L. Anton, B. Ferguson, **A. Joseph\***, M. A. Elovitz. Vaginal microbes leverage distinct molecular mechanisms to drive specific immune responses in epithelial and immune cells. *Society for Reproductive Investigation Annual Meeting*. Brisbane, Australia. (March 24<sup>th</sup>, 2023)
29. **A. Joseph\***, L. Anton, Y. Guan, B. Ferguson, M. A. Elovitz. Extracellular vesicles from vaginal microbes induce immune responses from multiple host cell types. *Society for Reproductive Investigation Annual Meeting*. Brisbane, Australia. (March 23<sup>rd</sup>, 2023)
30. **A. Joseph\***, L. Anton, C. Nyambura, E. Nance, M. A. Elovitz. Biocompatible nanoparticles to understand and improve perinatal outcomes. *Gordon Research Symposium and Conference on Drug Carriers in Medicine & Biology*. Dover, VT. (August 1<sup>st</sup>, 2022)
31. **A. Joseph\***, E. Lewis, B. Ferguson, L. Anton, M. A. Elovitz. Uterine colonization with *Gardnerella vaginalis* or *Mobiluncus mulieris* is insufficient to cause preterm birth. *American Society for Reproductive Immunology Annual Meeting*. Nashville, TN. (May 23<sup>th</sup>, 2022)
32. **A. Joseph\***, E. Lewis, B. Ferguson, K. Gerson, L. Anton, M. A. Elovitz. Uterine colonization with *Gardnerella vaginalis* is insufficient to cause preterm birth. *Society of Reproductive Investigation Annual Meeting*. Denver, CO. (March 19<sup>th</sup>, 2022)
33. **A. Joseph\***, G. Bondurant, A. Rios, D. Beebout, E. Nance. Catalase-loaded polymeric nanoparticles for neuroprotection after hypoxic-ischemic injury. *12<sup>th</sup> Hershey Conference on Developmental Brain Injury*. Virtual. (June 3<sup>rd</sup>, 2021)
34. **A. Joseph\***, R. Liao, M. Zhang, H. Helmbrecht, M. McKenna, J. Filteau, E. Nance. Injury severity impacts nanoparticle delivery to microglia in the injured brain. *Conte Symposium on Neuro-Immune Interactions*. Virtual. (March 24<sup>th</sup>, 2021)
35. **A. Joseph\***, R. Liao, M. Zhang, H. Helmbrecht, M. McKenna, J. Filteau, E. Nance. Injury severity impacts nanoparticle delivery to microglia in the injured brain. *Controlled Release Society Annual Meeting*. Virtual presentation (originally Las Vegas, NV). (June 29<sup>th</sup>-July 2<sup>nd</sup>, 2020)
36. **A. Joseph\***, R. Liao, C. Nyambura, K. Hildahl, E. Nance. Nanotechnology for therapeutic applications in the developing brain. *Chemical Engineering Research Showcase*. Seattle, WA. (February 27-28<sup>th</sup>, 2020)
37. G. Simo\*, **A. Joseph**, T. Gao, E. Nance. Evaluation of Surfactant Effects on Nanoparticle Toxicity in the Brain Microenvironment. *NCSU Future Leaders in Chemical Engineering Symposium*. Raleigh, NC. (October 27-28<sup>th</sup>, 2019)
38. **A. Joseph\***, T. Wood, C. Chen, K. Corry, J. Snyder, S. Juul, P. Parikh, E. Nance. Curcumin-loaded polymeric nanoparticles for neuroprotection in neonatal rats with hypoxic ischemic encephalopathy. *Biomedical Engineering Society Annual Meeting*. Philadelphia, PA. (October 16-19<sup>th</sup>, 2019)
39. G. Simo\*, **A. Joseph**, T. Gao, E. Nance. Evaluation of Surfactant Effects on Nanoparticle Toxicity in the Brain Microenvironment. *NSF REU in Data-enabled Science and Engineering Symposium*. Seattle, WA. (August 21<sup>st</sup>, 2019)
40. **A. Joseph\***, G. Simo, T. Gao, E. Nance. Surfactant choice in nanoparticle formulation drives nanoparticle behavior and fate in the brain. *Controlled Release Society*. Valencia, Spain. (July 21-24<sup>th</sup>, 2019)
41. **A. Joseph\***, R. Liao, M. Zhang, C. Nyambura, J. Filteau, E. Nance. Nanotherapeutics for developmental brain injury. *Chemical Engineering Research Showcase*. Seattle, WA. (March 1<sup>st</sup>, 2019)
42. **A. Joseph\***, R. Liao, E. Rhodes, H. Pontes, J. Pon, E. Nance. Surfactant effects on biodegradable nanoparticle behavior in the brain. *Nano Drug Delivery Symposium*. Portland, OR. (September 21-23<sup>rd</sup>, 2018)
43. **A. Joseph\***, T. Wood, C. Chen, K. Corry, J. Snyder, S. Juul, P. Parikh, E. Nance. Curcumin-loaded polymeric nanoparticles for neuroprotection in neonatal rats with hypoxic ischemic encephalopathy. New York City, NY. *Controlled Release Society*. (July 22-24<sup>th</sup>, 2018)
44. **A. Joseph**, T. Wood, C. Chen, K. Corry, J. Snyder, S. Juul, P. Parikh, E. Nance\*. Curcumin-loaded brain-penetrating nanoparticles for neuroprotection in neonatal HIE. Asilomar, CA. *11th Hershey Conference on Developmental Brain Injury*. (June 5-8<sup>th</sup>, 2018)

45. C. Curtis\*, **A. Joseph**, R. Liao, M. McKenna, M. Zhang, E. Nance. Nanotechnology and imaging-based platforms for the evaluation and treatment of neurological disease. Seattle, WA. *Chemical Engineering Research Showcase*. (March 2<sup>nd</sup>, 2018)

*Teaching lectures and workshops*

46. **A. Joseph\***, J. Antony\*, M. Cunningham\*, H. Okahana\*. National Postdoctoral Association Race & Ethnicity Equity Summit: What Comes Before. Virtual. (November 17, 2022)
47. **A. Joseph\***, M. Elovitz. The vaginal microbiome: optimizing for reproductive health across the lifespan. *The Better Health Club seminar*. Virtual. (December 6, 2021)
48. **A. Joseph\***, D. Peer\*, L. Mendes\*, N. Lamson\*. Back to Normal vs New Normal: Round Table Panel. *Controlled Release Society Annual Meeting*. Montreal, Canada; virtual. (July 15, 2021)
49. **A. Joseph\***, C. McNicholas\*, J. O'Connor\*, A. Duvall\*, Y. Venkataraman\*. Communication with Science-Averse Audiences. *Science Talk '21*. Seattle, WA. (March 24, 2021)
50. **A. Joseph\***. Nanomedicine uses in neurodegeneration. *UW Chemical Engineering 434/534: Physiological processes in engineering nanomedicine*. Seattle, WA. (March 10, 2021)
51. **A. Joseph\***, C. McNicholas\*, J. O'Connor\*, M. Garrett\*. How to Talk Science and Discuss Controversial Topics. *UW Engage*. Seattle, WA. (March 2, 2021)
52. **A. Joseph\***. Statistics in Biological Research. *UW Chemical Engineering 436: Chemical Engineering Laboratory I*. Seattle, WA. (November 10, 2020)
53. **A. Joseph\***. Essential Communication Skills for Scientists. *Controlled Release Society Annual Meeting*. Valencia, Spain. (June 14, 2020)

**V. TEACHING EXPERIENCE**

- 2021-present Polygence, *PhD research mentor*
- 2017-2021 Associates in Tutoring & Academic Consultation, *Advanced math & science tutor*
- Summer 2019 University of Washington, *Project Leader for Math Academy*
- Fall 2019 University of Washington, Chemical Engineering, *Teaching Assistant for Mass Transfer and Separations*
- Summer 2018 University of Washington, *Project Leader for Math Academy*
- Fall 2015 Johns Hopkins University, Chemical and Biomolecular Engineering, *Teaching Assistant for Introduction to Process Analysis*
- 2015-16 Johns Hopkins University, Introductory Chemistry, *Peer-Led Team Learning Leader*

**VI. MENTORSHIP and OUTREACH**

*Undergraduate Students*

- 2021-2023 Isabella Mirro, Bioengineering Bachelor's student
- 2021-2022 Nova Meng, Bioengineering Bachelor's student
- 2020-2021 Denise Beebout, Chemical Engineering Bachelor's student  
NSF REU, Fall 2020
- 2020-2021 Ana Rios, Bionengineering Bachelor's student  
UW STAR Program, Summer 2020
- 2019-2021 Norah Alhindi, Molecular and Cellular Biology Bachelor's student  
KAUST Scholar
- 2019-2020 Tora Gao, BS in Chemical Engineering  
*Current position:* PhD student at UCLA Chemical and Biomolecular Engineering
- 2018-2020 Georges Simo, BS in Chemical Engineering and Biochemistry  
Mary Gates Research Scholarship, Class of 1954 Scholarship, 2020 Husky 100 Recipient, Spence Scholarship  
*Current position:* Engineer at Bristol Myers Squibb, Seattle
- 2018 Hugo Pontes, BS in Chemical Engineering

CoMotion Fellowship, WRF Fellowship (2019, 2020), Honors Thesis candidate,  
 2020 Husky 100 Recipient  
*Current position:* PhD student at NIH Oxford-Cambridge Scholars program

2017-2020 Jessica Pon, BS in Chemical Engineering  
 2017-2018 Emily Rhodes, BS in Chemical Engineering  
 2018 Center for Sensorimotor Neural Engineering Scholarship  
*Current position:* PhD student at University of Colorado Boulder, Chemical and  
 Biological Engineering

2017-2018 Andrew Kirk, BS in Chemical Engineering  
 2017-2018 Catherine Panlillio, BS in Chemical Engineering  
 2017-2018 Sanchit Gad, BS in Chemical Engineering  
 2017-2018 Alex Choe, BS in Chemical Engineering

#### *High School Students*

2020 Maria Sati, Bellevue WA  
 2018 Sanjana Janakiraman, Bellevue WA  
 2017 Meghan Mallya, Austin TX, STEMMPREP

#### *Outreach*

2020 Introduce a Girl to Renewable Energy, ACES booth lead  
 2019 Science demonstration at Horizon Elementary School, Mukilteo School District  
 2019 Engineering Discovery Days, Nance Lab booth lead  
 2018 Women in Science and Engineering Conference (UW), Volunteer  
 2018 Engineering Discovery Days, Nance Lab booth lead  
 2017 Engineering Discovery Days, Nance Lab booth lead  
 2017 Introduce a Girl to Nano, Nance Lab booth lead

### **VII. EXTRACURRICULAR ACTIVITIES**

2022-present Editorial board member, Drug Delivery and Translational Research (International)  
 2022-2023 Chair, Postdoc Council, National Postdoctoral Association (National)  
 2021-2023 Regular contributor, Newsletter team, Controlled Release Society (International)  
 2021-2023 Secretary, Women in Science, Controlled Release Society (International)  
 2021-2023 Communication chair, Nervous System Delivery Focus Group, Controlled Release Society  
 (International)  
 2021-2023 Advocacy chair, Biomedical Postdoctoral Council, Philadelphia PA  
 2020-2021 Director of GradSWE, Society of Women Engineers at UW, Seattle WA  
 2020-2021 Treasurer, Young Scientists Committee, Controlled Release Society (International)  
 2020-2021 Board member, Engage Science Communication, Seattle WA  
 2019-2021 Graduate Student Liaison, Faculty Council on Women in Academia, Seattle WA  
 2019 President, Association of Chemical Engineering Graduate Students, Seattle WA  
 2018 Fundraising and event chair, Association of Chemical Engineering Graduate Students,  
 Seattle WA  
 2018-2020 Sponsorship Chair, Young Scientists Committee, Controlled Release Society  
 (International)  
 2017-2018 Vice President, Women in Chemical Engineering, Seattle WA  
 2016-2017 Social Director, Women in Chemical Engineering, Seattle WA  
 2014-2016 Mentor, Thread, Baltimore MD  
 2013-2016 Peer Tutor, Peer-Led Team Learning, Baltimore MD  
 2013-2015 Vice President, Club Tennis, Baltimore MD

### **VIII. MEMBERSHIPS**

American Institute of Chemical Engineers  
Controlled Release Society  
Society of Women Engineers  
Society for Reproductive Investigation  
American Society of Reproductive Immunology