

LUKE MACFARLAN

Luke.Macfarlan@UTexas.edu | 479.238.3857 | linkedin.com/in/LukeMacfarlan

SUMMARY

Ph.D. candidate with 8 years' experience in engineering research and design, including 4 years in chemical process design, using techniques such as computational fluid dynamics (CFD). Multiple industrial research and design experiences, including two with Fortune 500 companies. Outstanding credentials (National Merit Scholar and NSF Graduate Research Fellow), supported by an innovative, problem-solving mindset and self-motivation. Strong teamwork and communication skills, evidenced by evaluations during industry experience.

EDUCATION

University of Texas at Austin

(Expected) Aug 2021

Ph.D. in Chemical Engineering. GPA: 4.00/4.00

- National Science Foundation Graduate Research Fellow

John Brown University

2017

B.S. Engineering (Mechanical); Chemistry. GPA: 4.00/4.00

- National Merit Scholar, Presidential Honors

SKILLS

- Chemical Process: chemical separation design, structured packing analysis and optimization, vapor-liquid contactor operation, piping and instrumentation diagram (PID) analysis
- Software: CFD simulation (Star-CCM+, Fluent, CFX), computer-aided design (SOLIDWORKS, AutoCAD), Aspen, Zotero
- Communication: writing (1 manuscript completed, 1 submitted), oral presentation (4 conference talks), technical and non-technical audiences
- Teamwork: contribution to collaborative research projects in industry (3) and academia (2)

INDUSTRY & ACADEMIC RESEARCH EXPERIENCE

University of Texas at Austin, Process Science & Technology Center

2017 – Present

National Science Foundation Graduate Research Fellow

- Summary: Improving the mass transfer in vapor-liquid contactors using computational fluid dynamics (CFD) analysis
- Collaborate with industry sponsors quarterly, communicating ongoing research to 4 industrial R&D engineers and ensuring industrially relevant analysis strategies
- Optimized the geometry of structured packing column internals, reducing industrial operating expenditures, and producing a manuscript submitted for publication
- Evaluated literature CFD mass transfer methods for structured packing studies, resulting in a review paper manuscript citing 112 sources after surveying 160+ sources
- Assisted in operating a pilot-scale, divided-wall distillation column and processing data

Praxair Inc. (now Linde Group)

Summer 2018

Distillation Research & Development Intern

- Summary: Studied and rectified inefficiencies in vapor-liquid contactors using CFD
- Collaborated weekly with distillation research team, presenting findings and receiving suggestions, resulting in a 7/7 teamwork evaluation by manager
- Quantified performance trends during scale-up of vapor-liquid contactors, documented results in an internal report, and earned an “exceeds goals” communication evaluation
- Designed alternative contactor equipment to improve mass transfer efficiency

Cobb-Vantress, Inc. (subsidiary of Tyson Foods)

Summer 2017

Engineering Research & Development Intern

- Summary: Designed equipment to improve feed efficiency in poultry breeds
- Developed equipment using computer-aided design (CAD) software (SOLIDWORKS), cutting manufacturing costs by a third and significantly reducing assembly time
- Coordinated troubleshooting efforts of equipment, resulting in successful startup
- Presented results to a 35-person, non-technical audience and received significant engagement and positive feedback

Benham, a Haskell Company

Summer 2016

Mechanical Engineering Intern

- Summary: Supported contract design of oil, gas, and chemical plants
- Prepared plant layout as part of a multidisciplinary team for a multimillion-dollar chemical plant (involving sodium chlorate and hydrogen peroxide)
- Adjusted engineering designs to agree with customer specifications and national codes

U.S. Department of Energy

Summer 2015

Mickey Leland Energy Fellow

- Summary: Studied circulating fluidized beds with applications to fossil energy
- Documented results of circulating fluidized bed experiments, resulting in a *Powder Technology* publication
- Created Python code to analyze high-speed videos of fluidized, phosphorescent particles

Rice University

Summer 2014

NSF Research Experience for Undergraduates Program Participant

- Summary: Furthered efforts to store solar energy with photoelectrocatalytic water splitting
- Synthesized and characterized materials for renewable energy storage, resulting in a *Chemistry of Materials* publication
- Spearheaded application of electrochemical impedance spectroscopy in research group

PUBLICATIONS

L. Macfarlan, A. Seibert, M. Phan, R. Eldridge, “CFD-Based Structured Packing Optimization Study”, 2020, *manuscript submitted for publication*

R. Breault, E. Monazam, L. Shadle, S. Rowan, **L. Macfarlan**, “The effect of riser end geometry on gas-solid hydrodynamics in a CFB riser operating above fast fluidization regimes,” *Powder Technol.*, 2017, 316, pp 181–189

H. Robotjazi, S. Bahauddin, **L. Macfarlan**, S. Fu, I. Thomann, “Ultrathin AAO Membrane as a Generic Template for Sub-100 nm Nanostructure Fabrication,” *Chem. Mater.*, 2016, 28 (13), pp 4546–4553

SELECTED TECHNICAL PRESENTATIONS (1 OF 7)

L. Macfarlan, M. Phan, R. B. Eldridge, “Advanced Modeling for Structured Packing Development - B: Mass Transfer”, 2020 AIChE Spring Meeting 2020

EXTRACURRICULAR LEADERSHIP

Cru Grads at the University of Texas at Austin

2018 – Present

Leader

- Founded student organization and provided structure and vision in launching and sustaining the group
- Planned, organized, and facilitated monthly leadership planning meetings