

## **EDUCATION**

**Doctor of Philosophy in Biochemistry** **2017**

*University of Nebraska-Lincoln*

Department of Biochemistry

Dissertation: Role of Hyaluronan Metabolism in Prostate Tumor Aggressiveness and Stromal Transformation

**Master of Science in Chemical Engineering** **2012**

*University of Nebraska-Lincoln*

Department of Chemical and Biomolecular Engineering

Thesis: Technological Aspects of Molecular Diagnosis of Bacterial Infectious Diseases

**Bachelor of Engineering in Chemical Engineering** **2005**

*University of Pretoria*

Department of Chemical Engineering

First Class Pass and 4-year full scholarship from Sasol, Ltd.

## **PROFESSIONAL EXPERIENCE**

### **RESEARCH**

**Postdoctoral Research Associate** **2017-2020**

*University of Nebraska-Lincoln*

Department of Biochemistry

Techniques and expertise: computational learning module development; assessment of learning and student experience; proficient in Excel and various graphics programs used for diagram development; some experience with R; regulation of gene expression and metabolism (homeostasis); educational use of computational modeling, data collection and analysis.

**Graduate Research Assistant** **2012-2017**

*University of Nebraska-Lincoln*

Department of Biochemistry

Techniques and expertise: mammalian cell culture; imaging; protein purification, detection and quantification; hyaluronan metabolism; prostate cancer.

**Graduate Research Assistant** **2009-2012**

*University of Nebraska-Lincoln*

Department of Chemical and Biomolecular Engineering

Techniques and expertise: PCR; molecular diagnostics; bacterial expression systems; mathematical and computational modeling; infectious diseases.

## **TEACHING**

**Coordinator of the Scientific Writing Help Desk** **2019-present**

*University of Nebraska-Lincoln*

Responsibilities: one-on-one faculty consultation for designing writing assignments and assessments; development of curricular materials and new courses, training TAs to assess writing, in-class support for writing-related activities, one-on-one student tutoring and consultation for class assignments, thesis or dissertation; weekly sit-down-and-write graduate student social writing sessions, interdepartmental professional skills workshops (e.g. science communication).

**TEACHING (CONT.)**

**Instructor** **2019-present**  
*University of Nebraska-Lincoln*

Department of Agronomy and Horticulture  
 AGRO/HORT 496/896 Outreach communications (co-instructor) December mini-session 2020  
 AGRO/HORT 403/803 Scientific writing and communication Spring 2020

Department of Biochemistry  
 BIOC 205 Scientific analysis and technical writing Spring 2019

**Learning module development and in-class facilitation** **2018-2019**  
*University of Nebraska-Lincoln*

Department of Biochemistry  
 BIOC 431 Structure and Metabolism Fall 2018  
 Topics: Central metabolism (glycolysis, tricarboxylic acid cycle, and electron transport chain)

BIOC 432 Metabolism and Biological Information Spring 2018, Spring 2019  
 Topics: Purine metabolism and *lac* operon

**Graduate Teaching Assistant** **2009-2016**  
*University of Nebraska-Lincoln*

Department of Biochemistry  
 BIOC 433/833 Biochemistry laboratory Fall 2013, Spring 2015, Spring 2016

Department of Chemical and Biomolecular Engineering  
 CHME 442/842 Chemical Reactor Engineering and Design Fall 2010  
 CHME 323/823 Chemical Engineering Thermodynamics II Spring 2010  
 CHME 333 Transport Operations II Spring 2009

**INDUSTRY**

**Process Engineer** **2006-2009**  
*Sasol Ltd., South Africa*  
 Synfuels Secunda  
 Utilities Department

Sasol is an international petrochemical company that develops synthetic fuels and chemicals and produces electricity. In my role as process engineer in the Utilities Department, my major duties included redesign of old systems and support of technical operations.

**PUBLICATIONS**

**Booth CS**, Crowther, A, Helikar R, Luong, T, Howell ME, Couch BA, Roston R, van Dijk K, and Helikar T. *Teaching advanced concepts in regulation of the lac operon with modeling and simulation*. In revision.

**Booth CS**, Song, C, Howell ME, Rasquinha, A, Saska, A, Helikar R, Sikich, SM, Couch BA, van Dijk K, Roston R, and Helikar T. *Teaching Metabolism in Upper-division Undergraduate Biochemistry Courses using Online Computational Systems and Dynamical Models Improves Student Performance*. In press. (early draft available to view at <https://www.biorxiv.org/content/10.1101/2020.02.18.953380v1>)

## PUBLICATIONS (CONT.)

Howell, ME, **Booth CS**, Sikich, SM, Helikar T, van Dijk K, Roston R, and Couch BA. *Interactive learning modules with 3D printed models improve student understanding of protein structure-function relationships*. *Biochemistry and Molecular Biology Education*, 48(4): 356-368.

Howell ME, **Booth CS**, Sikich SM, Helikar T, Couch BA, Roston RL, and van Dijk K. (2019) *Student Understanding of DNA Structure–Function Relationships Improves from Using 3D Learning Modules with Dynamic 3D Printed Models*. *Biochemistry and Molecular Biology Education*, 47(3): 303-317.

McAtee CO\*, **Booth CS\***, Elowsky C, Zhao L, Payne J, Fangman T, Caplan S, Henry M, and Simpson MA (2019) *Prostate tumor cell exosomes containing hyaluronidase Hyal1 stimulate prostate stromal cell motility by engagement of FAK-mediated integrin signaling*. *Matrix Biology*, 78-79:165-179.

\*co-first author.

Howell ME, van Dijk K, **Booth CS**, Helikar T, Couch BA, and Roston RL. (2018) *Visualizing the invisible: A guide to designing and 3-D printing dynamic molecular models to teach structure-function relationships*. *Journal of Microbiology and Biology Education*, 19(3): 19.3.100.

Crowther A, Bergan-Roller HE, Galt NJ, **Booth CS**, Dauer JT, Helikar, T *Discovering Prokaryotic Gene Regulation with Simulations of the trp Operon*. CourseSource, <https://www.coursesource.org/courses/discovering-prokaryotic-gene-regulation-with-simulations-of-the-trp-operon>.

Grobler A, Levanets O, Whitney S, **Booth CS** and Viljoen, H. (2012) *Rapid cell lysis and DNA capture in a lysis microreactor*. *Chemical Engineering Science*, 81:311-8.

Freifeld AG, Simonsen KA, **Booth CS**, Zhao X, Whitney SE, Karre T, Iwen PC and Viljoen HJ (2012) *A new rapid method for Clostridium difficile DNA extraction and detection in stool: toward point-of-care diagnostic testing*. *The Journal of Molecular Diagnostics*, 14(3):274-9.

Louw, TM, **Booth CS**, Pienaar E, TerMaat JR, Whitney SE, and Viljoen HJ (2011) *Experimental validation of a fundamental model for PCR efficiency*. *Chemical Engineering Science*, 66(8):1783-9.

**Booth CS**, Pienaar E, TerMaat JR, Whitney SE, Louw TM and Viljoen HJ (2010) *Efficiency of the polymerase chain reaction*. *Chemical Engineering Science*, 65(17):4996-5006.

## PATENTS

Viljoen HJ, Whitney SE, Freifeld A, **Booth CS**, Zhao X (2011) *Sample processing method and device*. Publication number: WO2011153244 A1 filed by Streck, Inc.

## AWARDS

Agronomy and Horticulture Graduate Student Association: Faculty Appreciation Award "Outstanding guidance to graduate students in the area of scientific writing and communication"	<b>2020</b>
Travel Award: CourseSource Writing Workshop	<b>2018</b>
Poster Presentation Prize: Molecular Mechanisms of Disease Annual Symposium	<b>2015</b>

## PROFESSIONAL ACTIVITIES

### MENTORSHIP

Mentored 5 undergraduate student researchers, and two are co-authors.

2011-2018

### PRESENTATIONS AND PROFESSIONAL DEVELOPMENT

Society for the Advancement of Biology Education Research Annual Conference; **Research presentation:** *A computational modeling approach to teach the regulatory principles of metabolism.* Booth CS, Song C, Howell, ME, Rasquinha A, Saska A, Helikar R, Sikich SM, Couch BA, van Dijk L, Roston RL, and Helikar T, 2020.

(Accepted, but canceled due to COVID19) Experimental Biology 2020; **Workshop presentation:** Engaging the Next Generation of Biochemistry Students: Using 3D-printed models to teach structure-function relationships and computer models to teach metabolic systems. Roston RL, Helikar T, Couch B, Howell M and Booth CS, 2020.

Nebraska Academy of Science Annual Spring Meeting; **Workshop presentation:** *Teaching and learning the dynamics of cellular respiration using interactive computer simulations: An introduction for instructors.* Booth CS, and Helikar T, 2019.

Society for the Advancement of Biology Education Research Annual Conference; **Research presentation:** *A computational modeling approach to teach the regulatory principles of cellular respiration.* Booth CS, van Dijk K, Roston R, Couch BA, Howell M and Helikar T, 2019.

Society for the Advancement of Biology Education Research Annual Conference; **Poster presentation:** *Improving Biochemistry Education through Computational Modeling.* Booth CS, van Dijk K, Roston R, Couch B, Howell M and Helikar T, 2018.

CourseSource Writing Studio Workshop at the University of Minnesota; **Participant**, 2018.

Alan Alda Center for Communicating Science Workshop at University of Nebraska-Lincoln; **Participant**, 2017.

Molecular Mechanisms of Disease Annual Symposium at the University of Nebraska-Lincoln; **Poster presentation:** *Hyaluronan-based signals mediate stromal cell transformation in a prostate cancer cell model.* Booth CS, McAtee CO, Payne JS, Jezewski E and Simpson MA, 2017.

Molecular Mechanisms of Disease Annual Symposium at the University of Nebraska-Lincoln AND Annual Redox Biology Retreat at Eugene T. Mahoney State Park NE; **Poster presentation:** *Hyaluronan-based signals mediate stromal cell transformation in a prostate cancer cell model.* Booth CS, McAtee CO, Payne JS, Fangman T and Simpson MA, 2016.

Campuswide Workshops for Graduate Teaching Assistants at the University of Nebraska-Lincoln. Disciplinary Breakout Session: Life Sciences and Natural Resources. **Invited presentation:** *Being an effective TA* Booth, CS (graduate student representative from the Department of Biochemistry), 2016.

Molecular Mechanisms of Disease Annual Symposium at the University of Nebraska-Lincoln; **Poster presentation:** *Hyaluronan-based signals mediate stromal cell transformation in prostate cancer.* Booth CS, Payne JS, McAtee CO and Simpson MA, 2015.

Molecular Mechanisms of Disease Annual Symposium at the University of Nebraska-Lincoln AND Annual Redox Biology Retreat at Eugene T. Mahoney State Park NE; **Poster presentation:** *Hyaluronan-based signals mediate stromal cell transformation in prostate cancer.* Booth CS, McAtee CO, and Simpson MA, 2014.

## ACADEMIC SERVICE

Ad hoc reviewer for the following journals:

*International Journal of STEM education* **2020**  
*CourseSource* **2020**

University of Nebraska State Museum's March Sunday with a Scientist **2017**  
 "Seeing the Invisible" with Dr. Limei Zhang and team  
 This series highlights scientific works by presenting it to children and their families in a fun and informal way, typically through interactive activities.

Schuyler Nebraska High school student visit at the Department of Biochemistry **2017**  
 Guided a group of students using a 3D printed model activity with Drs. Rebecca Roston and Michelle Howell.

Biochemistry Graduate Student Association: Ackerson committee co-chair **2015**  
 The selection committee was tasked with various aspects of speaker selection, invitation and visitation schedule development. Michelle (Palmer) Howell and Jared Aldridge were co-chairs.

University of Nebraska-Lincoln Women in Science **2014**  
 Cancer biochemistry laboratory with Drs. Melanie Simpson, Joe Barycki and team

## PROFESSIONAL MEMBERSHIPS

American Society for Biochemistry and Molecular Biology **2020-present**  
 Society for the Advancement of Biology Education Research **2017-present**  
 Golden Key International Honor Society – UNL Chapter **2008-present**