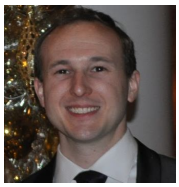

Chase Brown

Neuroscientist and Bioinformatics Ph.D. Candidate
Chemical and Biological Materials Engineer, B.Sc., M.Sc.

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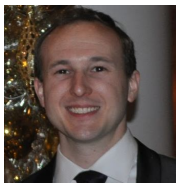

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Highly motivated neuroscientist/bioinformatician with many years of experience in machine learning software development and chemical engineering. My interest is to develop new systems for automating the process of generating valuable research questions and automating collection and analysis for fellow scientists. My specific expertise lies within machine learning, natural language processing techniques, nanomaterial separations, and optical systems for material characterization within both academic and industrial environments.

EXPERIENCE

PhD Candidate in Neuroscience

Oklahoma Medical Research Foundation — Bioinformatics Department
University of Oklahoma Health and Sciences Center — Neuroscience Department
2016 - PRESENT

Developed novel AI systems to simultaneously analyze the scientific literature (via natural language processing techniques) and sequencing data to automate hypothesis generation. Focuses of the system towards nanomaterials in oncology were explored.

- Created a literature-based discovery (LBD) system on multiplexed networks generated via text extraction with neural network multi-headed attention systems (i.e. transformers)
- Constructed an API for performing meta-analyses on transriptomic and epigenetic signatures
- Combined the LBD and meta-analysis system for application towards drug discovery for glioblastoma

Dr. Ferenc Deak Rotation (Aug – Sept 2016):

- Extracted SNARE Proteins from mouse hippocampal sections
- Characterization of SNARE proteins (synaptobrevin 1 and 2)

Dr. Rheal Towner Rotation (Sept – Oct 2016):

- Developed software for analysis of MRI data
- Blood brain barrier and glioblastoma drug research
- Treatment of lipopolysaccharide induced neuroinflammation in rats

Dr. Jonathan Wren Rotation (Oct – Dec 2016):

- Chemical name spelling correction with recurrent neural network
- Research Swanson linking drug discovery system for neuroinflammatory disease

Dr. Priayabrata Mukherjee Rotation (Jan – Feb 2017):

- Research in cystathionine beta synthase in ovarian cancers and neurovascular disease

Dr. Wren (March 2016 - Present)

- Developed system for meta-analysis of RNA-seq and mRNA expression data and extraction of relevant biological identifiers via machine learning techniques for text extraction

Image Processing Software Developer

Intellilease, Oklahoma City, OK
2016 - 2017

- Developed image processing software and hardware for automatic document processing of dated public documents
- Performed as technology consultant for automatic document processing hardware

Graduate Research Assistant - Chemical and Biological Materials Engineering

University of Oklahoma, Norman, OK — Chemical and Biological Materials Engineering Department
2013 - 2016

Produced stimuli-responsive catalytic nanoparticle supports for rapid reaction halting and recycling in biofuel production.

- Developed spectroscopic and image processing software to automate lab analysis of experimental data
- Modeled the effect of acid treatments and carbon nanotube defect chemistry on stability and properties of Pickering emulsions
- Researched stimuli responsive multiphase systems via magnetic catalytic supports for the purpose of studying reactions at liquid-liquid interfaces in order to produce biofuels and specialty chemicals using Parr reactors

Lead Research and Development Engineer and Supervisor

SouthWest Nanotechnologies, Norman, OK— Research and Development Department
2013 - 2016

Managed separations and characterization operations. Lead plant production of conductive nanomaterial

SKILLS

Machine Learning | Natural Language Processing | Tensorflow | PyTorch | spaCy | Transformers | RNA-seq | Drug Synergy | Drug Discovery | Photophysical modeling | Stanford coreNLP

Languages:

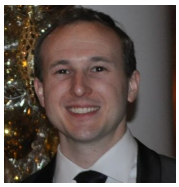
- Python
- Bash
- R
- SQL
- Julia
- LaTeX
- Java
- Matlab
- C++

Software:

- Blender
- OriginLab
- PyMol

AWARDS / POSITIONS

- **1st place @ Kaggle Competition** AI symposium
- Seed Grant for metformin on glioblastoma
- **Best paper** "ALE: automatic label extraction" at MCBIOS



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ink products. Operated as lead separations and characterization expert in various techniques (SEM, EDS, TEM, AFM, TPx, IR, fluorescence, Raman, OA, etc.)

- Advised and mentored interns in all of the company's scripting projects, characterization, and separations processes
- Collaborated with Jeffrey Fagan and Zheng Ming at the National Institute of Standards and Technology (NIST) to refine Aqueous-Two Phase Systems (ATPS) for separating SWCNT material.
- Developed separation process to increase product purity from 40% of desired chiral purity to >80%
- Managed and performed maintenance on all spectroscopic software and equipment
- Developed and applied physical theories in order to create software for automated daily material characterization by spectral analysis
- Managed plant production team for all carbon nanotube production and application development
- Worked with my team of technicians on the sites programmable logic controllers (PLCs) to improve process control of reactors and purification units
- Managed plant reactor and purification processes to match customer needs
- Led production of SWCNT ink products and developed continuous improvements to the SWCNT ink process
- Supervised technicians and operators in order to maintain production schedule and ensure the safety of operations while creating new solutions for continuous improvement of plant processes

Research and Development Engineer Intern

SouthWest Nanotechnologies, Norman, OK— Research and Development Department
2010 - 2013

Managed separations and characterization operations. Lead plant production of conductive nanomaterial ink products. Operated as lead separations and characterization expert in various techniques (SEM, EDS, TEM, AFM, TPx, IR, fluorescence, Raman, OA, etc.):

- Developed programs in various languages (python, C++, VBA) in order to easily and quickly characterize SWCNT samples by electronic type, chirality, defects, diameter, and length
- Researched and created algorithms to apply towards spectral analysis and to model physical phenomenon
- Developed and optimized easily scalable chiral separation processes for single walled carbon nanotubes (SWCNTs), which created several new products for our company

Undergraduate Researcher

University of Oklahoma, Norman, OK — Chemical and Biological Materials Engineering Department
Jan 2009 - May 2009

Produced stimuli-responsive catalytic nanoparticle supports for rapid reaction halting and recycling in biofuel production.

- Researched computational solutions to determine protein folding dynamics
- Programmed in FORTRAN for determining large molecule solvation shells

EDUCATION

PhD — *Neuroscience*

Focus: (Bioinformatics in Exosome Tumorigenesis)
University of Oklahoma Health and Sciences Center, *Oklahoma City*
2016 - 2020

- Dissertation: Clarifying the role of exosomes in senescence-induced tumorigenesis to aid drug discovery of synergistic chemotherapy

Dissertation Advisor: Jonathan Wren, PhD

Master's — *Chemical and Biological Materials Engineering*

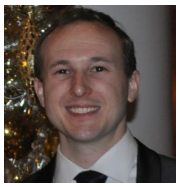
Focus: (Nanoparticles in Biphasic Catalysis)
University of Oklahoma, Norman
2013 - 2016

- Thesis: Carbon nanotubes and magnetic particles as Pickering emulsion stabilizers: Particle control for phase selective reactions

Thesis Advisor: Steven Crossley, PhD

EXTRACURRICULAR ACTIVITIES

- OKCatalyst program for business development from university research
- Graduate Student Association (Treasurer)
- Judge at 2019 GREAT Conference
- Guest lecturer at local seminar (neuro night), Fountains at Canterbury, Oklahoma City
- American Institute of Chemical Engineers (AICHE)
- Boy Scouts of America - Eagle Scout
- Phi Sigma Pi National Honors Fraternity
- Engineering Dean's Honor Roll (Spring 2009,'10,2011-'12)
- Pride of Oklahoma Marching Band (Trumpet) (2007-2008)
- Sooner Elementary Engineering and Science (Sees)
- Kappa Kappa Psi Band Fraternity



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Bachelor's — *Chemical and Biological Materials Engineering*

University of Oklahoma, Norman
2007 - 2013
Minor: Physics

GRANTS / PUBLICATIONS

- Oklahoma Center for Neuroscience Seed Grant: "Metformin Methylation in Glioblastoma Multiforme –Drug Synergy Mechanisms and Repurposing Discovery with Bioinformatics Systems"

- C. Brown. (2016) "Carbon nanotubes and magnetic particles as Pickering emulsion stabilizers: particle control for phase selective reactions"Master's Thesis University of Oklahoma
- Giles, Cory B., Chase A. Brown, Michael Ripperger, Zane Dennis, Xiavan Roopnarinesingh, Hunter Porter, Aleksandra Perz, and Jonathan D. Wren. "ALE: automated label extraction from GEO metadata." BMC bioinformatics 18, no. 14 (2017): 509.
- Towner, Rheal A., Nataliya Smith, Debra Saunders, Chase A. Brown, Xue Cai, Jadith Ziegler, Samantha Mallory et al. "OKN-007 increases temozolomide (TMZ) sensitivity and suppresses TMZ-resistant glioblastoma (GBM) tumor growth." *Translational oncology* 12, no. 2 (2019): 320-335.
- Briggs, Nicholas, Ashwin Kumar Yegya Raman, Lawrence Barrett, Chase Brown, Brian Li, Devlin Leavitt, Clint P. Aichele, and Steven Crossley. "Stable pickering emulsions using multi-walled carbon nanotubes of varying wettability." Colloids and Surfaces A: Physicochemical and Engineering Aspects 537 (2018): 227-235.
- Perz, Aleksandra I., Cory B. Giles, Chase A. Brown, Hunter Porter, Xiavan Roopnarinesingh, and Jonathan D. Wren. "MNEMONIC: MetageNomic Experiment Mining to create an OTU Network of Inhabitant Correlations." *BMC bioinformatics* 20, no. 2 (2019): 96.
- Zalles, Michelle, Nataliya Smith, Jadith Ziegler, Debra Saunders, Shannon Remerowski, Lincy Thomas, Rafal Gulej et al. "Optimized monoclonal antibody treatment against ELTD1 for GBM in a G55 xenograft mouse model." *Journal of Cellular and Molecular Medicine* (2019).
- Chase Brown, John-David Rocha, Ricardo Prada Silvy. "SWCNT Characterization by Optical Absorption Spectra" Rice Undergraduate Symposium, October 2012, Rice University, Houston, TX
- Chase Brown, John-David Rocha, Yongqiang Tan, Ricardo Prada Silvy, Dave Arthur, Robert Headrick, Adam Reitz. "Limitations of spectroscopic analysis for determining SWCNT electronic properties" American Chemical Society 2011 Southwest Regional Meeting. November 10, 2011 Austin, TX

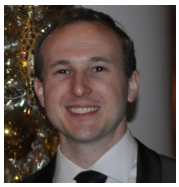
TEACHING / MENTORING EXPERIENCE

Mentorship

Southwest Nanotechnologies

- **Jacob Asselin** (Undergraduate) - Project: Fluorescence, Raman, and optical absorbance modeling of nanoparticle photophysics for improving lab characterization of nanomaterials
- **Warren Wright** (Undergraduate) - Project: Process optimization of aqueous two-phase extraction (ATPE) systems for separation of specific SWCNT species/chiralities
- **William Campbell** (Undergraduate) - Project: Surfactant optimization in adsorption chromatography-based separation of nanoparticles
- **Chris Jennings** (Undergraduate) - Project: Heterogeneous catalysis development for larger diameter, metallic carbon nanotubes
- **Adam Reitz** (Undergraduate) - Project: Polymer additives and their use in adsorption chromatography for SWCNT separations
- **John Shetley** (Undergraduate) - Project:
- **Hannah Whorton** (Undergraduate) - Project: Atomic Force Microscopy and Fluorescence Microscopy methods for electronic character determination in carbon nanomaterials

- **John Kibe** (Technician) - Project: Optimizing programmable logic controller (PLC) flows for automated SWCNT production in addition to standard operating procedures for catalysis synthesis, SWCNT production, and lab characterization.



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Mentorship

University of Oklahoma Health and Sciences Center

- **Margaret Bourlon** (Graduate Student) - Project: Developing an annotated corpus for multiple labeling of biological entities, relationships, and classifications of biological metadata texts.

Teaching

University of Oklahoma Health and Sciences Center

- **Science Python Users Group** (Guest lecturer) - Topic: Neural networks in modeling biology - Use of recurrent neural networks to predict paired mRNA expression from DNA methylation data
- **Invited for August 2020 - Methods in Neuroscience Course** (Guest lecturer) - Topic: Use of machine learning and artificial neural networks in understanding biological data

RELEVANT COURSEWORK

Programming

Chemical and Biological Materials Engineering Department

- Programming Structures and Abstractions
- Introduction to Programming
- Numerical Methods Chemical Engineering

Biological Sciences

University of Oklahoma Chemical and Biological Materials Engineering Department

- Tissue Engineering
- Physiology
- Neurobiology
- General Principles of Pharmacology
- Metabolic Regulation
- Molecular Systems I/II
- Cellular Systems I/II

Chemical Engineering Methods

- Transmission Electron Microscopy
- Structures and Properties of Materials
- Nanocomposites
- Physical Chemistry I & II
- Organic Chemistry I & II
- Chemical Engineering Separations Processes
- Advanced Chemical Engineering Thermodynamics
- Advanced Chemical Engineering Transfer Phenomenon
- Advanced Chemical Engineering Kinetics
- Advanced Materials Design for Battery Applications

Physics

- Solid State Physics
- Quantum Physics