**FACULTY VITA**

Date: 6.8.2020

Name: Nigel Reuel

Department: Chemical and Biological Engineering

Current Rank: Assistant Professor

1. **BACKGROUND, PROFESSIONAL EXPERIENCE AND RECOGNITIONS**
   1. Education

Massachusetts Institute of Technology, Ph.D., Chemical Engineering, Feb 2014

Brigham Young University, B.S., Chemical Engineering, April 2009

* 1. Academic Appointments

Assistant Professor of Chemical Engineering, Iowa State University, Aug 2016 to present

* 1. Other Professional Employment

- President and Founder, Skroot Laboratory Inc. Nov 2018 to present

- Corporate Technology Scout, DuPont Corporate, Jan 2016 to Aug 2016

- Research Investigator (PI), DuPont Central Research, April 2014 to Jan 2016

- Independent Tech Transfer Agent, Volvox Biologic, Jan 2014 to April 2014

- Marketing Fellow, MIT Technology Transfer Office, Sep 2013 to Feb 2014

- Graduate Research Assistant, MIT Strano Group, Dec 2009 to Jan 2014

- Undergraduate Research Assistant, BYU Blood Lab, Sep 2006 to April 2009

- MEMS Device Summer Intern, Sandia National Labs, May 2003 to Aug 2007

* 1. Honors and Awards

- 3M Non-Tenured Faculty Award (2020)

- BMES Advanced Biomanufacturing Junior Investigator (2020, talk delayed by COVID)

- IA Biotech Showcase Award – 1st Place for Skroot Laboratory, Inc. (2020)

- Jack R. and Carol A. Johnson Faculty Fellow in Chemical and Biol. Engineering (2019)

- Alexander von Humboldt CONNECT Award (2018)

- Black & Veatch Building a World of Difference Faculty Fellow in Engineering (2017)

- Frontiers of Engineering Symposium, National Academy of Engineering Invitee (2017)

- ‘Most Enthusiastic Instructor,’ ISU AICHE Student Chapter (2016, 2017, 2018)

- ‘Exceeding Expectation’ performance review, DuPont (2014, 2015)

- Bionanotechnology Graduate Student Award 1st Place, AICHE (2013)

- Lemelson-MIT Student Prize Finalist (2013)

- Collegiate Inventors Competition National Finalist (2013)

- Merck Innovation Cup Finalist (2013)

- Masschallenge Global Finalist (2013)

- MIT 100k Business Competition Life Science Track Semi-Finalist (2013)

- Fall 2012 Best MIT Chemical Engineering Thesis Seminar

- 2012 Pierce Biotechnology $5k Award (2012)

- DAAD Research Grant Recipient (2011)

- MIT 100K Elevator Pitch Semifinalist Life Science Track (2011, 2012)

- MIT Teacher Certificate Program (2011)

- NSF Graduate Fellowship Recipient (2010)

- Lufthansa Award for Excellence in German Studies (2010)

- Hertz Graduate Fellowship Finalist (2009)

- NIH Oxford/Cambridge Graduate Fellowship - withdrew to attend MIT (2009)

- Barry M. Goldwater Scholar (2008-2009)

- BYU Gordon B. Hinckley Presidential Scholarship (2003-2009)

- Magna Cum Laude Latin distinction - top 5% BYU University GPA (2009)

- BYU University Honors with Undergraduate Thesis (2009)

- National AP Scholar - Over eight AP tests with scores of five (2003)

- US Congressional Presidential Scholar (2003)

1. **SCHOLARSHIP AND RESEARCH/CREATIVE ACTIVITIES**
   1. Scholarship

*# Denotes any publication derived from the candidate’s thesis/dissertation.*

*+ Denotes Reuel Group student co-author.*

*\* Denotes corresponding author*

*[ISU] Denotes paper as PI at ISU, 12 total.*

* + 1. Articles in Peer-Reviewed Journals – In Print or Accepted
       1. Carr, A. R. +; Patel, Y. H.; Neff, C. R. +; Charkhabi, S. +; Kallmyer, N. E. +; Angus, H. F.; **Reuel, N. F.**\* Sweat Monitoring beneath Garments Using Passive, Wireless Resonant Sensors Interfaced with Laser-Ablated Microfluidics. *npj Digital Medicine* 2020, 3 (1), 1–9. https://doi.org/10.1038/s41746-020-0270-2. [ISU]
       2. Chan, Y. J.; Carr, A. R.; Charkhabi, S.; Furnish, M.; Beierle, A. M.; **Reuel, N. F.\*** Wireless Position Sensing and Normalization of Embedded Resonant Sensors Using a Resonator Array. *Sensors and Actuators A: Physical* 2020, 111853. https://doi.org/10.1016/j.sna.2020.111853. [ISU]
       3. Dopp, J. L. +; Jo, Y. R. +; **Reuel, N. F.\*** Methods to Reduce Variability in E. Coli-Based Cell-Free Protein Expression Experiments. *Synth Syst Biotechnol* 2019, 4 (4), 204–211. <https://doi.org/10.1016/j.synbio.2019.10.003>. [ISU]
       4. Tamiev, D. +, Lantz, A. +, Vezeau, G., Salis, H. M. & **Reuel, N. F.\*** Controlling Heterogeneity and Increasing Titer from Riboswitch-Regulated Bacillus subtilis Spores for Time-Delayed Protein Expression Applications. *ACS Synth. Biol.* (2019). doi:10.1021/acssynbio.9b00163 [ISU]
       5. Kallmyer, N. E. +; Shin, H. J. +; Brem, E. A.; Israelsen, W. J.; **Reuel, N. F.\*** Nesting Box Imager: Contact-Free, Real-Time Measurement of Activity, Surface Body Temperature, and Respiratory Rate Applied to Hibernating Mouse Models. *PLOS Biology* 2019, *17* (7), e3000406. https://doi.org/10.1371/journal.pbio.3000406. [ISU]
       6. Charkhabi, S. +; Chan, Y. J. +; Hwang, D.-G.; Frey, S. T.; Bartlett, M. D.; **Reuel, N. F.\*** Kirigami-Enabled, Passive Resonant Sensors for Wireless Deformation Monitoring. *Advanced Materials Technologies* 2019, *4* (5), 1800683. https://doi.org/10.1002/admt.201800683. [ISU]
       7. Dopp, J. L.+, Rothstein, S. M., Mansell, T.J., and **Reuel, N. F.**\* "Rapid Prototyping of Proteins: Mail Order Gene Fragments to Assayable Proteins Within 24 Hours" *Biotechnol Bioeng*, (2019) doi: 10.1002/bit.26912 [ISU]
       8. Dopp, J. L.+, Tameiv, D. D. +, **Reuel N. F.**\* "Cell-free supplement mixtures: Elucidating the history and biochemical utility of additives used to support in vitro protein synthesis in E. coli extract." *Biotechnol Adv.* 2019 Jan - Feb;37(1):246-258. doi: 10.1016/j.biotechadv.2018.12.006. Epub 2018 Dec 17. [ISU]
       9. Dopp, J. L. + and **Reuel, N. F.**\* “Process Optimization for Scalable E. Coli Extract Preparation for Cell-Free Protein Synthesis” *Biochemical Engineering Journal* 138, (2018): 21–28. doi:10.1016/j.bej.2018.06.021 [ISU]
       10. Kallmyer, N. E. +, Huynh, T. +, Graves, J. C. +, Musielewicz, J. +, Tamiev, D. +, and **Reuel, N. F.**\* “Influence of Sonication Conditions and Wrapping Type on Yield and Fluorescent Quality of Noncovalently Functionalized Single-Walled Carbon Nanotubes” *Carbon* 139, (2018): 609–613. doi:10.1016/j.carbon.2018.07.028 [ISU]
       11. Charkhabi, S. +, Beierle, A. M. +, McDaniel, M. D., and **Reuel, N. F.**\* “Resonant Sensors for Low-Cost, Contact-Free Measurement of Hydrolytic Enzyme Activity in Closed Systems” *ACS Sensors* 3, no. 8 (2018): 1489–1498. doi:10.1021/acssensors.8b00267 [ISU]
       12. Kallmyer, N. E. +, Musielewicz, J. +, Sutter, J. +, and **Reuel, N. F.**\* “Substrate-Wrapped, Single-Walled Carbon Nanotube Probes for Hydrolytic Enzyme Characterization” *Analytical Chemistry* 90, no. 8 (2018): 5209–5216. doi:10.1021/acs.analchem.7b05444 [ISU]
       13. **Reuel, N. F.**\*, McAuliffe, J. C., Becht, G. A., Mehdizadeh, M., Munos, J. W., Wang, R., and Delaney, W. J. “Hydrolytic Enzymes as (Bio)-Logic for Wireless and Chipless Biosensors” *ACS Sensors* 1, no. 4 (2016): 348–353. doi:10.1021/acssensors.5b00259
       14. Nelson, J. T., Kim, S., **Reuel, N. F.**, Salem, D. P., Bisker, G., Landry, M. P., Kruss, S., Barone, P. W., Kwak, S., and Strano, M. S. “Mechanism of Immobilized Protein A Binding to Immunoglobulin G on Nanosensor Array Surfaces” *Analytical Chemistry* 87, no. 16 (2015): 8186–8193. doi:10.1021/acs.analchem.5b00843
       15. Zhang, J., Kruss, S., Hilmer, A. J., Shimizu, S., Schmois, Z., De La Cruz, F., Barone, P. W., **Reuel, N. F.**, Heller, D. A., and Strano, M. S. “A Rapid, Direct, Quantitative, and Label-Free Detector of Cardiac Biomarker Troponin T Using near-Infrared Fluorescent Single-Walled Carbon Nanotube Sensors” *Advanced Healthcare Materials* 3, no. 3 (2014): 412–423. doi:10.1002/adhm.201300033
       16. Paulus, G. L. C., Nelson, J. T., Lee, K. Y., Wang, Q. H., **Reuel, N. F.**, Grassbaugh, B. R., Kruss, S., Landry, M. P., Kang, J. W., Ende, E. V., Zhang, J., Mu, B., Dasari, R. R., Opel, C. F., Wittrup, K. D., and Strano, M. S. “A Graphene-Based Physiometer Array for the Analysis of Single Biological Cells” *Scientific Reports* 4, (2014): 6865. doi:10.1038/srep06865
       17. Mu, B., Zhang, J., McNicholas, T. P., **Reuel, N. F.**, Kruss, S., and Strano, M. S. “Recent Advances in Molecular Recognition Based on Nanoengineered Platforms” *Accounts of Chemical Research* 47, no. 4 (2014): 979–988. doi:10.1021/ar400162w
       18. Landry, M. P., Kruss, S., Nelson, J. T., Bisker, G., Iverson, N. M., **Reuel, N. F.**, and Strano, M. S. “Experimental Tools to Study Molecular Recognition within the Nanoparticle Corona” *Sensors* 14, no. 9 (2014): 16196–16211. doi:10.3390/s140916196
       19. Kruss, S., Landry, M. P., Vander Ende, E., Lima, B. M. A., **Reuel, N. F.**, Zhang, J., Nelson, J., Mu, B., Hilmer, A., and Strano, M. “Neurotransmitter Detection Using Corona Phase Molecular Recognition on Fluorescent Single-Walled Carbon Nanotube Sensors” *Journal of the American Chemical Society* 136, no. 2 (2014): 713–724. doi:10.1021/ja410433b
       20. Giraldo, J. P., Landry, M. P., Faltermeier, S. M., McNicholas, T. P., Iverson, N. M., Boghossian, A. A., **Reuel, N. F.**, Hilmer, A. J., Sen, F., Brew, J. A., and Strano, M. S. “Plant Nanobionics Approach to Augment Photosynthesis and Biochemical Sensing” *Nature Materials* 13, no. 4 (2014): 400–408. doi:10.1038/nmat3890
       21. **#Reuel, N. F.**, Grassbaugh, B., Kruss, S., Mundy, J. Z., Opel, C., Ogunniyi, A. O., Egodage, K., Wahl, R., Helk, B., Zhang, J., Kalcioglu, Z. I., Tvrdy, K., Bellisario, D. O., Mu, B., Blake, S. S., Van Vliet, K. J., Love, J. C., Wittrup, K. D., and Strano, M. S. “Emergent Properties of Nanosensor Arrays: Applications for Monitoring IgG Affinity Distributions, Weakly Affined Hypermannosylation, and Colony Selection for Biomanufacturing” *ACS Nano* 7, no. 9 (2013): 7472–7482. doi:10.1021/nn403215e
       22. Kruss, S., Hilmer, A. J., Zhang, J., **Reuel, N. F.**, Mu, B., and Strano, M. S. “Carbon Nanotubes as Optical Biomedical Sensors” *Advanced Drug Delivery Reviews* 65, no. 15 (2013): 1933–1950. doi:10.1016/j.addr.2013.07.015
       23. Iverson, N. M., Barone, P. W., Shandell, M., Trudel, L. J., Sen, S., Sen, F., Ivanov, V., Atolia, E., Farias, E., McNicholas, T. P., **Reuel, N.**, Parry, N. M. A., Wogan, G. N., and Strano, M. S. “In Vivo Biosensing via Tissue-Localizable near-Infrared-Fluorescent Single-Walled Carbon Nanotubes” *Nature Nanotechnology* 8, no. 11 (2013): 873–880. doi:10.1038/nnano.2013.222
       24. **#Reuel, N. F.**, Mu, B., Zhang, J., Hinckley, A., and Strano, M. S. “Nanoengineered Glycan Sensors Enabling Native Glycoprofiling for Medicinal Applications: Towards Profiling Glycoproteins without Labeling or Liberation Steps” *Chemical Society Reviews* 41, no. 17 (2012): 5744–5779. doi:10.1039/C2CS35142K
       25. **#Reuel, N. F**., Dupont, A., Thouvenin, O., Lamb, D. C., and Strano, M. S. “Three-Dimensional Tracking of Carbon Nanotubes within Living Cells” *ACS Nano* 6, no. 6 (2012): 5420–5428. doi:10.1021/nn301298e
       26. **#Reuel, N. F.**, Bojo, P., Zhang, J., Boghossian, A. A., Ahn, J.-H., Kim, J.-H., and Strano, M. S. “NoRSE: Noise Reduction and State Evaluator for High-Frequency Single Event Traces” *Bioinformatics (Oxford, England)* 28, no. 2 (2012): 296–297. doi:10.1093/bioinformatics/btr632
       27. Mu, B., McNicholas, T. P., Zhang, J., Hilmer, A. J., Jin, Z., **Reuel, N. F**., Kim, J.-H., Yum, K., and Strano, M. S. “A Structure–Function Relationship for the Optical Modulation of Phenyl Boronic Acid-Grafted, Polyethylene Glycol-Wrapped Single-Walled Carbon Nanotubes” *Journal of the American Chemical Society* 134, no. 42 (2012): 17620–17627. doi:10.1021/ja307085h
       28. Zhang, J., Boghossian, A. A., Barone, P. W., Rwei, A., Kim, J.-H., Lin, D., Heller, D. A., Hilmer, A. J., Nair, N., **Reuel, N. F.**, and Strano, M. S. “Single Molecule Detection of Nitric Oxide Enabled by d(AT)15 DNA Adsorbed to Near Infrared Fluorescent Single-Walled Carbon Nanotubes” *Journal of the American Chemical Society* 133, no. 3 (2011): 567–581. doi:10.1021/ja1084942
       29. Ulissi, Z. W., Zhang, J., Boghossian, A. A., **Reuel, N. F**., Shimizu, S. F. E., Braatz, R. D., and Strano, M. S. “Applicability of Birth–Death Markov Modeling for Single-Molecule Counting Using Single-Walled Carbon Nanotube Fluorescent Sensor Arrays” *The Journal of Physical Chemistry Letters* 2, no. 14 (2011): 1690–1694. doi:10.1021/jz200572b
       30. Shih, C.-J., Vijayaraghavan, A., Krishnan, R., Sharma, R., Han, J.-H., Ham, M.-H., Jin, Z., Lin, S., Paulus, G. L. C., **Reuel, N. F.**, Wang, Q. H., Blankschtein, D., and Strano, M. S. “Bi- and Trilayer Graphene Solutions” *Nature Nanotechnology* 6, no. 7 (2011): 439–445. doi:10.1038/nnano.2011.94
       31. Sangermano, M., Marino, F., **Reuel, N**., and Strano, M. S. “Semiconducting Single-Walled Carbon Nanotubes as Radical Photoinitiators” *Macromolecular Chemistry and Physics* 212, no. 14 (2011): 1469–1473. doi:10.1002/macp.201100076
       32. **#Reuel, N. F.**, Ahn, J.-H., Kim, J.-H., Zhang, J., Boghossian, A. A., Mahal, L. K., and Strano, M. S. “Transduction of Glycan–Lectin Binding Using Near-Infrared Fluorescent Single-Walled Carbon Nanotubes for Glycan Profiling” *Journal of the American Chemical Society* 133, no. 44 (2011): 17923–17933. doi:10.1021/ja2074938
       33. Kim, J.-H., Patra, C. R., Arkalgud, J. R., Boghossian, A. A., Zhang, J., Han, J.-H., **Reuel, N. F.**, Ahn, J.-H., Mukhopadhyay, D., and Strano, M. S. “Single-Molecule Detection of H2O2 Mediating Angiogenic Redox Signaling on Fluorescent Single-Walled Carbon Nanotube Array” *ACS Nano* 5, no. 10 (2011): 7848–7857. doi:10.1021/nn201904t
       34. Heller, D. A., Pratt, G. W., Zhang, J., Nair, N., Hansborough, A. J., Boghossian, A. A., **Reuel, N. F.**, Barone, P. W., and Strano, M. S. “Peptide Secondary Structure Modulates Single-Walled Carbon Nanotube Fluorescence as a Chaperone Sensor for Nitroaromatics” *Proceedings of the National Academy of Sciences* 108, no. 21 (2011): 8544–8549. doi:10.1073/pnas.1005512108
       35. Boghossian, A. A., Zhang, J., Le Floch-Yin, F. T., Ulissi, Z. W., Bojo, P., Han, J.-H., Kim, J.-H., Arkalgud, J. R., **Reuel, N. F.**, Braatz, R. D., and Strano, M. S. “The Chemical Dynamics of Nanosensors Capable of Single-Molecule Detection” *The Journal of Chemical Physics* 135, no. 8 (2011): 84124. doi:10.1063/1.3606496
       36. Boghossian, A. A., Zhang, J., Barone, P. W., **Reuel, N. F**., Kim, J.-H., Heller, D. A., Ahn, J.-H., Hilmer, A. J., Rwei, A., Arkalgud, J. R., Zhang, C. T., and Strano, M. S. “Near-Infrared Fluorescent Sensors Based on Single-Walled Carbon Nanotubes for Life Sciences Applications” *ChemSusChem* 4, no. 7 (2011): 848–863. doi:10.1002/cssc.201100070
       37. Ahn, J.-H., Kim, J.-H., **Reuel, N. F**., Barone, P. W., Boghossian, A. A., Zhang, J., Yoon, H., Chang, A. C., Hilmer, A. J., and Strano, M. S. “Label-Free, Single Protein Detection on a Near-Infrared Fluorescent Single-Walled Carbon Nanotube/Protein Microarray Fabricated by Cell-Free Synthesis” *Nano Letters* 11, no. 7 (2011): 2743–2752. doi:10.1021/nl201033d
       38. James, C. D., McClain, J., Pohl, K. R., **Reuel, N.**, Achyuthan, K. E., Bourdon, C. J., Rahimian, K., Galambos, P. C., Ludwig, G., and Derzon, M. S. “High-Efficiency Magnetic Particle Focusing Using Dielectrophoresis and Magnetophoresis in a Microfluidic Device” *Journal of Micromechanics and Microengineering* 20, no. 4 (2010): 45015. doi:10.1088/0960-1317/20/4/045015
       39. James, C. D., **Reuel, N**., Lee, E. S., Davalos, R. V., Mani, S. S., Carroll-Portillo, A., Rebeil, R., Martino, A., and Apblett, C. A. “Impedimetric and Optical Interrogation of Single Cells in a Microfluidic Device for Real-Time Viability and Chemical Response Assessment” *Biosensors and Bioelectronics* 23, no. 6 (2008): 845–851. doi:10.1016/j.bios.2007.08.022
    2. Articles in Peer-Reviewed Journals – In Review/Revision

1. Dopp, J. L., Reuel, N. F. “Simple, Functional, Inexpensive Cell Extract for *In vitro* Prototyping of Proteins with Disulfide Bonds.” [Revising]

2. Charkhabi, S., Carr, A. R., Wu, J., Roy, S., Beierle, A. M., Thomas, D. K., Neihart, N. M., Reuel, N. F. “Resonant Sensor Arrays for Wireless Characterization of Solvated Ions.” [Revising]

3. Tamiev, D., Reuel N.F. “Application of Classification Convolution Neural Networks in Quantifying Bacterial Cell Sub-populations.” [Revising]

4. Kallmyer, N. E., Abdennadher, M. S., Agarwal, S., Baldwin-Kordick, R. Khor, R. L., Kooistra, A. S., Peterson, E., McDaniel, M. D., Reuel, N. F. “Rapid soil enzyme activity measurement with a modular single-walled carbon nanotube sensor.” [Revising]

5. Kallmyer, N. E., Rider, N. E., Reuel, N. F. “Design and Validation of a Frugal, Automated, Solid-Phase Peptide Synthesizer.” [Submitted]

6. Charkhabi, S., Chan, Y. J., Roy, S., Islam, M. M., Duffield, B. B., Jackson, K. J., Bu, L. Kim, S. H., Hillier, A. C., Neihart, N. M., Reuel, N. F. “Effects of Fabrication Materials and Methods on Resonant Sensor Signal Quality.” [Submitted]

* + 1. Peer-Reviewed Conference Proceedings, Bulletins, or Reports – In Print/Accepted

Elsherbiny, O., Roy, S., Charkhabi, S., Carr, A., Beierle, A., Reuel, N., Neihart, N. “Physically Inspired Circuit Model for Systematic Analysis of Resonant Ion Sensor.”

(ISCAS 2020)

* + 1. Books and Book Chapters

None.

* + 1. Formally Invited Seminars and Presentations

1. 04/2020 – AWARD session talk “Passive, Wireless Sensors for Single Use Bioreactor Process Analytical Technologies.” [NOTE: Delayed to March 2021 due to COVID-19], BMES Advanced Biomanufacturing (location TBD)
2. 11/14/2019 – “Rapid Prototyping of Biohybrid Nanostructures for Sensing and Responsive Materials” AICHE Annual Meeting, Orlando, FL.
3. 8/16/2019 – “Single Walled Carbon Nanotubes as Spatiotemporal Sensors of Hydrolytic Activity,” Regional NANO@IAState, Ames, IA.
4. 7/30/2019 – “Wireless, passive, low-cost sensors for closed environments,” 3M Tech Connect Forum, St. Paul, MN.
5. 7/26/2019 – “Wireless, passive, low-cost chemical/biological sensors,” Adelphi Laboratory Center U.S. Army Research Laboratory, Adelphi, MD.
6. 7/23/2019 – “Wireless, passive sensors for next-generation biomanufacturing process analytics.” AstraZeneca, Gaithersburg, MD.
7. 8/9/2018 – “Flexible Resonant Sensors for Under PPE Sweat and Temperature Monitoring to Help Warn Against Heat Stress,” Assistance to Firefighters Grant (AFG) Program Fire Prevention and Safety (FP&S) Research and Development Annual Meeting, Dallas, TX.
8. 5/21/2018 – “Near infrared and short wave radio frequency sensors for wireless biomanufacturing process analytics” NSF Engineering Research Center for Cell Manufacturing Technologies (CMaT) at Georgia Tech.
9. 4/23/2018 – “Near infrared optical sensors and short wave radio frequency resonant sensors to monitor ions, proteins, and cells in closed systems” BioQuant Institute, Heidelberg University, Heidelberg, Germany
10. 4/20/2018 – “Near infrared optical sensors and short wave radio frequency resonant sensors to monitor ions, proteins, and cells in closed systems” Max Planck Institute for Terrestrial Microbiology, Marburg, Germany
11. 3/22/2018 – “Resonant Sensors for Tissue Dielectric Spectroscopy” Baylor College of Medicine Vascular Surgery at VA Hospital, Houston, TX
12. 3/6/2018 – “Wireless, passive, [ultra]low-cost sensors for closed environments” Mechanical Engineering Department graduate seminar, Iowa State University
13. 2/23/2018 – “Prototyping with Pyralux® - Flexible, wireless, passive, resonant sensors for ions, proteins, and motion” DOW Electronics and Imaging Department Seminar, Marlborough, MA
14. 2/22/2018 – “Prototyping with Pyralux® - Flexible, wireless, passive, resonant sensors for ions, proteins, and motion” DuPont Electronics and Imaging Department Seminar, Wilmington, DE
15. 1/12/2018 – “High-Throughput Characterization of Hydrolytic Enzymes in Low Volume and Closed Systems.” PepTalk Protein Engineering Conference, San Diego, CA
16. 11/7/2017 – “Characterization, Control, and Circuit Design of Hydrolytic Enzymes” Chemistry colloquium speaker – Syracuse Chemistry Department
17. 03/31/2017 – “Contact-free Electromagnetic Interfaces to Biology - from the Near IR to High Frequency Bands.” German-American Frontiers of Engineering Symposium, National Academy of Engineering, Evendale, Ohio

*[Faculty Candidate Talks 2016]:*

1. 2/18/2016 – “Measuring Proteins: Contact-free and label-free biosensors for antibody quality and hydrolytic enzyme activity.” Faculty candidate seminar at Colorado School of Mines Department of Chemical Engineering. Golden, CO
2. 1/29/2016 – “Measuring Proteins: Contact-free and label-free biosensors for antibody quality and hydrolytic enzyme activity.” Faculty candidate seminar at University of Utah Chemical Engineering. Salt Lake City, UT
3. 1/28/2016 – “Measuring Proteins: Contact-free and label-free biosensors for antibody quality and hydrolytic enzyme activity.” Faculty candidate seminar at Brigham Young University Chemical Engineering. Provo, UT
4. 1/21/2016 – “Measuring Proteins: Contact-free and label-free biosensors for antibody quality and hydrolytic enzyme activity.” Faculty candidate seminar at Iowa State University Chemical and Biological Engineering. Ames, IA
   * 1. Contributed Presentations

NOTE: Two talks at ACS Spring 2020 Meeting [postponed due to COVID-19]

1. Dopp, J., Reuel, N. F. “Simple Cell-Free Extract for Expression of Disulfide Bonded Proteins Without Addition of Exogenous Polymerase and Chaperones.” AICHE Cell Free Systems Conference, Boston, MA 12/5/2019
2. Kallmyer, N. E., Reuel, N. F. “Modular Fluorescent Carbon Nanotube Sensors for Discovery and Optimization of Cell Free Expressed Peptides and Enzymes.” AICHE Cell Free Systems Conference, Boston, MA 12/5/2019
3. Reuel, N. F., Tamiev, D. “Robust Cell Free Extract from *Bacillus subtilis* to prototype engineered spore circuitry.” AICHE Cell Free Systems Conference, Boston, MA 12/5/2019
4. Kallmyer, N. E., Reuel, N.F. “Substrate-functionalized carbon nanotubes as enzyme probes for benchtop and in situ study of soil health.” MRS Fall Meeting, Boston, MA. 12/3/2019
5. Charkhabi, S., Reuel, N. F. “Scalable fabrication of resonant sensors and applications in wireless reporting of soft material deformation.” MRS Fall Meeting, Boston, MA. 12/3/2019
6. Charkhabi, S., Chan, Y. J., Reuel, N. F. “Kirigami-Enabled, Passive Resonant Sensors for Wireless Deformation Monitoring.” AICHE Fall Meeting, Orlando, FL. 11/14/2019
7. Reuel, N. F. “Reinforcing Design of Experiments, Regression, and Optimization with Paper Helicopters.” AICHE Fall Meeting, Orlando, FL. 11/13/2019.
8. Hedengren, J., Kantor, J., Reuel, N. F. “Temperature Control Lab for Dynamics and Control.” AICHE Fall Meeting, Orlando, FL. 11/13/2019
9. Tamiev, D., Lantz, A., Vezeau, G., Salis, H. and Reuel, N.F. “Controlling Heterogeneity and Increasing Titer from Riboswitch-Regulated *Bacillus subtilis* Spores for Time-Delayed Protein Expression Applications.” 20th International Conference on Bacilli and Gram-Positive Bacteria. Washington D.C. 7/25/2019.
10. Dopp, J., Reuel, N. F. “Scalable cell-free extract preparation and minimal genetic template methods for rapid protein prototyping.” AICHE SEED 2019. NYC, NY. 6/24/2019.
11. Tamiev, D., Lantz, A., Vezeau, G., Salis, H. and Reuel N. F. “Controlling Heterogeneity and Increasing Titer from Riboswitch-Regulated *Bacillus subtilis* Spores for Time-Delayed Protein Expression Applications.” AICHE SEED 2019. NYC, NY. 6/24/2019.
12. Charkhabi, S., Carr, A., Neihart, N., Reuel, N. F. “Passive Resonant Sensors for Wireless Detection and Quantification of Ionic Compounds in Opaque Systems.” SPIE Defense + Commercial Sensing 2019. Baltimore, MD. Apr. 2019.
13. Dopp, J., Reuel N. F.“Scalable cell-free extract preparation and minimal genetic template methods for rapid protein prototyping.” ACS Annual Meeting. Orlando, FL. Apr. 2019.
14. Kallmyer, N., Khor, R., Abdennadher, M., Roby, N., Agarwal, S., Peterson, E., Reuel, N. F. “Nanoscale Optical Sensors to Characterize Hydrolytic Enzymes for Health, Agriculture, and Industrial Biotechnology” ACS Annual Meeting. Orlando, FL. Apr. 2019.
15. Tamiev, D., Vezeau, G., Lantz, A., Salis, H., Reuel, N. F. “Evaluating Heterogeneity of Heterologous Protein Expression from Germinated Spores for Shelf-Stable Cell Factories in Space” ACS Annual Meeting. Orlando, FL. Apr. 2019.
16. Kallmyer, N., Peterson, E., Reuel, N. F. “Substrate Functionalized Carbon Nanotubes as a Modular Tool for Tracking Soil Enzyme Activity.” AICHE Annual Meeting. Pittsburgh, PA. Nov 1, 2018.
17. Kallmyer, N., Huynh, T., Graves, J. C., Musielewicz, J., Reuel, N. F. “Influence of Sonication Conditions and Wrapping Type on Yield and Fluorescent Quality of Noncovalently Functionalized Single-Walled Carbon Nanotubes.” AICHE Annual Meeting. Pittsburgh, PA. Nov 1, 2018.
18. Reuel, N. F. “The Startup Method of Managing Large Classes – a Technique Inspired by ASEE Summer School 2017.” AICHE Annual Meeting. Pittsburgh, PA. Oct 29, 2018.
19. Reuel, N. F., Charkhabi, S. and Beierle, A.“Short wave radio frequency resonators for transducing protein and cell surface interactions in closed systems.” ACS Annual Spring Meeting, Biotechnology Division. New Orleans, LA. Mar 18, 2018.
20. Charkhabi, S., Jackson, K., Reuel, N. F. “Wireless Resonators Proposed for Monitoring Diabetic Foot Ulcers.” Diabetic Lower Extremity Symposium, Boston, MA Nov 2-3, 2017.
21. Charkhabi, S., Beierle, A., Reuel, N. F. “Wireless Measurement of Enzymatic Degradation Kinetics with a Resonant Antenna Biosensor.” AICHE Annual Conference, Minneapolis, MN. Oct 30, 2017.
22. Kallmyer, N., Reuel, N. F. “Substrate-wrapped Carbon Nanotubes as Enzyme Sensors.” AICHE Annual Conference, Minneapolis, MN. Nov 1, 2017.
23. Reuel, N. F. “Prototyping Proteins and Proteases for Biosensors and Enzyme Responsive Materials.”, ISU Microbiology Graduate Program Interdepartmental Fall Retreat, Oct 19, 2017.
24. Reuel, N. F.**,** Kallmyer, N. “Carbon Nanotube Based Optical Sensors for Biomanufacturing.” BMES ABioM Meeting, Madison WI, Aug 8, 2017
25. Reuel, N. F., “M-file Toolbox Method of Teaching Numerical Methods to Chemical Engineers.” ASEE Chemical Engineering Faculty Summer School, Raleigh, NC July, 2017
26. Reuel, N. F., et al. “High-throughput screening of hydrolytic enzyme activity via wireless antennas with embedded (bio)-logic.” American Chemical Society Spring Meeting, San Francisco, April 4, 2017.
27. Reuel**,** N. F.**,** McAuliffe, J., Becht, G. A., Mehdizadeh, M., Munos, J., Wang, R., Delaney, W. J. “Hydrolytic Enzymes as ‘Bio-Logic’ for Wireless and Chipless Biosensors.” Chemical Heritage Foundation Innovation Day 2015, Philadelphia, PA 2015
28. Reuel, N. F., Strano M. S. “Carbon Nanotube Based Optical Sensors for Proteins and Glycans – Applications in Biomanufacturing Process Control.” NIST Panel at Koch Institute, Nov 2012
29. Reuel, N. F. “Carbon Nanotube Based Optical Sensors for Proteins and Glycans – Applications in Biomanufacturing.” ChemE Department Student Seminar, October 2012
30. Reuel, N. F., Ahn, J. H., Kim, J. H., Zhang, J., Boghossian, A. A., Strano, M. S. “Transduction of Glycan-Lectin Binding using Near Infrared Fluorescent Single Walled Carbon Nanotubes for Glycan Profiling.” APS March Meeting, Boston. March, 2012.
31. Reuel, N. F.“Nanotechnology meets Biology – Advances and Safety.” Invited Talk at MIT EHS, Jan. 2012.
32. Reuel, N. F., Ahn, J. H., Kim, J. H., Zhang, J., Boghossian, A. A., Strano, M. S. “Transduction of Glycan-Lectin Binding using Near Infrared Fluorescent Single Walled Carbon Nanotubes for Glycan Profiling.” BioMAN MIT. Boston. 18 Nov. 2011.
33. Reuel, N. F., Ahn, J. H., Kim, J. H., Zhang, J., Boghossian, A. A., Strano, M. S. “A Weak Affinity Dynamic Microarray for Glycan Profiling: modeling and preliminary experimentation of a high-throughput tool for screening and profiling glycoproteins.” 21st Int Symposium on Glycoconjugates. Vienna. 21-26 Aug. 2011.
34. Reuel, N. F., Ahn, J. H., Strano, M. S. “Sweet-Sensing.” MRS Fall Meeting. Boston, 1-3 Dec. 2010.
35. Reuel, N. F., Ahn, J. H., Strano, M. S. “A Weak Affinity Dynamic Microarray for Glycan Profiling: a concept for optimized, high-throughput screening and profiling of glycoproteins.” CFG Glycan Array Conference 2010. Atlanta, 19-21 September. And ACS National Meeting 2010. Boston, August.
    * 1. Other Scholarly Contributions
36. James, C. D., McClain, J. L., Achyuthan, K., Bourdon, C. J., Rahimian, K., Galambos, P. C., Derzon, M. S., Reuel, N. F. “A Portable Bead-Based Detection System with Integrated Magnetic Preconcentration and Dielectrophoretic Multichannel Cytometry.” Sandia National Lab Public Report 2008.
37. Reuel, N. F. “Development of the MD Ring: A Micro-passive Glucose Sensor for Diabetics.” BYU Honors Thesis. 2008.
    1. Patents, Disclosures, and Technology Transfer

[ISU count: 12 disclosures, 7 provisional filings, 4 converted to U.S. utility, 2 licensed]

1. Reuel, N. F., Carr, A. R. “ISURF 05076 Resonant sweat analysis sensor with wireless reader.” (2020) U.S. Provisional filed.
2. Reuel, N. F., Tamiev, D. “ISURF 05071 Training dataset augmentation and classification convolution neural network for quantifying object sub-populations.” (2020). No filing, active case.
3. Reuel, N. F., Kallmyer, N. E., “ISURF 05030 Optical phytase activity sensor.” (2019) U.S. Provisional filed.
4. Reuel, N. F., Chan, Y. “ISURF 04984 Resonator array for position sensing and resonant sensor normalization.” (2019) No filing, active case.
5. Reuel, N. F., Kallmyer, N. E. “ISURF 04972 Cell membrane proxy probes for screening cell penetration efficacy.” (2019) No filing, active case.
6. Reuel, N. F., Carr, A. R. “ISURF 04856 Resonant sensors for wireless, online monitoring of cell concentration in biomanufacturing.” (2018) U.S utility filed. Exclusive license by Skroot Laboratory Inc.
7. Reuel, N. F., Charkhabi, S., “ISURF 04748 Ion Sensing with Multiplex Array of Resonant Sensors.” (2018) No filing, active case.
8. Reuel, N. F., Bartlett, M., Charkhabi, S., Hwang, D. “ISURF 04747 Kirigami Enabled Resonators for Stretch and Force Sensing and Wireless Power Transfer Switch in Soft Materials.” (2018) U.S. Provisional filed.
9. Reuel, N. F., Charkhabi, S. “ISURF 04749 Wireless Tissue Dielectric Spectroscopy with Resonant Sensors.” Provisional filed (2018).
10. Reuel, N. F., Dopp, J. L., “ISURF 04757 Methods for producing large scale extract and genetic templates for protein prototyping with cell free protein synthesis.” Disclosure on hold for more data (2018)
11. Reuel, N. F., Charkhabi, S. “ISURF 04633 Resonant Frequency Shift Sensors.” (2017) Utility patent filed.
12. Reuel, N.F., Kallmyer, N. E. “ISURF 04667 Optical nanosensors for hydrolytic enzyme characterization.” (2017). Utility patent filed.
13. Reuel, N. F., McAuliffe, J. C., “Radio frequency bio-sensor.” US Patent App. 14/872,178 (2015)
14. Reuel, N. F., Strano, M. S., Wahl, R., Helk, B. “Method of analysis using array sensor.” US Patent App. 14/017,413 (2014)
15. Reuel, N. F., Strano, M. S. “Sensor for detecting analytes.” US Patent App. 14/185,856 (2014)
16. Iverson, N. M; Strano, M. S., Reuel, N. F., McNicholas, T. P. “Near infrared fluorescent single walled carbon nanotubes as tissue localizable biosensors.” US Patent App. 14/488,040 (2014)
17. Strano, M. S., Ahn, J. H., Kim, J. H., Barone, P. W., Reuel, N. F. “Nanotube Array for Optical Detection of Protein-Protein Interactions.” US Patent App. 13/222,706 (2012)
18. Reuel, N. F., Lionberger, T. A., Galambos, P. C., Okandan, M., Baker, M. S. “Micro-unmanned aerodynamic vehicle.” US Patent 7,341,222 (2008)
    1. Funded Grants and Contracts
19. 05/20 to 04/21 “RAPID Assessment for COVID-19 RNA in Large Populations with Low-Cost, Mail-Safe, Fast-Scan Sensor Systems." Reuel. N. F, (PI) and Green, A. (co-PI). NSF Award #2029532, $200,000 ($150,000 to Reuel).
20. 06/20 to 06/23 “3M NFTA: Smart Soft Materials – Adhesives and Bandages with Embedded Resonant Sensors.” Reuel, N. F. (sole PI). $45,000.
21. 07/20 to 07/23 “Learning Communities of Graduates for Advancing Professional Skills (GAPS): Integrate Professional Skill Training with Thesis.” Jiang, S. (PI), Kremer, G. O., Gansemer-Topf, A., Reuel, N., and Qing, L. (co-PI) NSF DGE # 1954946. $500,000 ($90,000 to Reuel).
22. 07/19 to 02/20 “STTR: Resonant Sensors for Wireless Monitoring of Viable Cell Concentration in Small, Disposable Bioreactors.” Glatz, C. (PI), Neihart, N. (co-PI), Reuel N. F. (senior personnel due to COI rules, author of grant) NSF IIP # 1915860. $225,000 ($157,500 to Skroot Lab, $67,500 to Neihart).
23. 04/19 to 08/19 “I-Corps: Smart Surface Sensors.” Reuel, N. F. (sole PI). NSF IIP # 1924882. $50,000.
24. 04/19 to 08/19 Seed Grant for ISU ERC Bid. “Hydration ‘Soft-Sensor’ Proof of Concept.” Reuel N. F. (PI), Gomes. C, Claussen, J. (co-PI). ISU VPR. $20,000 ($10,000 to Reuel).
25. 02/19 to 05/19 Carver Seed Grant. “Time-Delayed Heterologous Protein Expression from *Bacillus subtillis* spores.” Reuel, N. F. (sole PI). ISU BBMB. $30,000.
26. 09/18 to 09/18 “Developing Flexible Resonator Sensors in an Industry/University Ecosystem.” Reuel, N.F. (PI), Neihart N, Bu, L. and Kim, S.H. (co-PI). NSF IIP #1827578. $750,000. ($382,500 to Reuel).
27. 08/18 to 08/2021 “Resonant Sensors for Monitoring Undercoat Perspiration to Indicate Heat Stress.” Reuel, N. F. (sole PI). From DHS Federal Emergency Management Agency (FEMA). $225,000.
28. 05/17 to 08/17 “Measurement Tool Design Course Preparation.” Reuel, N. F. (sole PI). From DuPont Pioneer. $10,000.
29. 06/2016 to present “Equipment Donation for Reuel Lab.” Reuel, N. F. (sole PI). From DuPont Central Research. $508,000.
    1. Pending Grants and Contracts
30. 2020 to 2021 “Short term research initiative: Quantifying Genotypic Diversity Caused by Sporulation.” (PI) ARO $50,000 (PO attempting to start Nov 2020)
31. 2020 to 2024 “Unsupervised optimization of protein therapeutics using closed-loop in vitro synthesis, Nano sensing, and deep‐learning.” (PI) NIH MIRA ESI $1,800,000. [Received historically-funded impact score, pending council review]
32. 05/20 to 05/21 “SBIR Phase I: Sensors for Continuous Monitoring of Microcarrier Cell Culture for Improved COVID-19 Vaccines Production.” (to Skroot Laboratory, Inc. NFR author and senior person) NSF Phase I rapid SBIR $256,000.
33. 9/20 to 8/25 “Wireless, continuous monitoring of cell therapy quality in closed, static bioreactors.” (PI) NIH U01 $3.2M ($500,000 to NFR).
34. 9/20 to 9/25 “Dynamics of Soil Microbial Community Production of Extracellular Enzymes Crucial to Nitrogen Mineralization.” (PI) DOE Young Investigator Award $850,000.
35. 9/20 to 8/22 “SBIR Phase II: Resonant Sensors for Wireless Monitoring of Viable Cell Concentration in Small, Disposable Bioreactors.” (to Skroot Laboratory, Inc. NFR author and senior person) NSF Phase II SBIR $1M.
36. 9/20 to 9/23 “Wireless, Passive Sensors for Animal Welfare and their Environmentally Sustainable Production.” (PI) FFAR New Innovator Award, finalist stage. $450,000
37. 6/20 to 6/22 “Expedited Screening of COVID-19 Inhibitors with Abiotic Cell Proxies for Pandemic Response.” (PI) NIH R21, $380,000
38. 3/21 to 3/26 “CAREER: Real-time Process Control of Stem Cell Expansion to Reduce Differentiation Heterogeneity.” (PI) NSF, $600,000 (planned July 2020)
39. **TEACHING AND STUDENT MENTORING**
    1. Instruction for ISU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Term (most recent first)** | **Course number** | **Course Title** | **Credits** | **Lab** | **Number of students** | **TA/graders** |
| Spring 2020 | -- | [Teaching Buyout] | -- | -- | -- | -- |
| Fall 2019 | ChE 310 | Numerical Methods | 3 | No | 51 | 0.5/1 |
| Spring 2019 | ChE 310 | Numerical Methods | 3 | No | 35 | 1/1 |
| Fall 2018 | ChE 421 | Process Control | 3 | No | 78 | 1/1 |
| Spring 2018 | -- | [Teaching release] | -- | -- | -- | -- |
| Fall 2017 | ChE 310 | Numerical Methods | 3 | No | 67 | 0.5/1 |
| Spring 2017 | ChE 356 | Transport I (Fluids) | 3 | No | 68 | 0.5/1.5 |
| Fall 2016 | ChE 310 | Numerical Methods | 3 | No | 42 | 0.5/1 |

* 1. Curricular Development Activity for ISU

- Participated with COE planning meetings for Jim Fay product development course

- Participated with CBE graduate committee for ChE 412X preparatory course

* 1. Supervision of Students as Major Professor

- Sakib Ferdous, PhD Track, Oct 2019 to present, work in progress

- Yee Jher Chan, PhD track, Oct 2019 to present, work in progress

- Adam Carr, PhD Track, Oct 2018 to present; oral qualifier complete.

- Jared Dopp, Oct 2016 to present; **MS completed 2018**; graduating Spring 2021 PhD.

- Denis Tamiev, Dec 2018 to present; PhD track BBMB, graduating PhD Spring 2021. Prelim complete.

- Nathaniel Kallmyer, PhD track, Oct 2016 to present. Prelim complete; graduation Spring 2021.

- Sadaf Charkhabi, PhD track, Oct 2016 to **July 16, 2020 [scheduled PhD DEFENSE]**. MS completed 2018. Prelim complete.

* 1. Service on Graduate Student Committees

- PhD POSC for Darshna Pagariya (Chem PhD track)

- PhD POSC for Soheila Shabaniverki (ME PhD in 2020)

- PhD POSC for Shuting Yan (CBE PhD in 2019)

- PhD POSC for Mir Hossen (CBE PhD in 2019)

- PhD POSC for Fatima Enam (CBE PhD in 2019)

- PhD POSC for Russell Mahmood (CBE PhD in 2019)

- PhD POSC for Simon Kuihon (BBMB 2017 to present)

- M.Eng dissertation defense for Dillon Hurd (CBE MS in Dec 2017)

- PhD POSC for Linxiang Yin (PhD BBMB in Dec 2017)

- PhD POSC for Jaewook Kim (PhD BBMB in July 2017)

- Grad qualifiers, as assigned by the CBE graduate committee (2016 to present)

* 1. Supervision of Post-Doctoral Students and Professional Staff

[None]

* 1. Supervision of Independent Study and Undergraduate Research

\* Denotes student listed on ISU publication

H = denotes honors program student

* + - 1. Ciara McNeley (Spring 20) – Resonant biosensors for diagnostics
      2. Zachary Lynch (Spring 20) – Resonant sweat sensor v2.0
      3. Lance Parish (Spring 20) – Temperature sensor and wearability
      4. Divyesh Kumar (Spring 20) – Phytase sensors
      5. Benjamin Matlock (Spring 20) – Label free protein-protein sensors
      6. Ellery Clouse (Spring 20) – Resonant sensors for cells
      7. Cullen Walsh (19) – Microfluidics prototyping
      8. Danielle Eeg (19) – Nanosensors for soil and health
      9. Mustafa Farahat (19) – nanosensors for health applications
      10. Brock Duffield (19) – Printing of resonant sensors
      11. Katherine (Yeong Ran) Jo (19) – Cell Free Protein Synthesis reproducibility
      12. Mohamed Seddik Abdennadher (19) – Soil sensors
      13. Juhyung (Ju) Jung (Summer and Fall 18) – Cell Free Protein Synthesis
      14. Sarah Ketcham (Fall 18) – Smart surface resonant sensors for food
      15. Branden Moreau (Fall 18) – Resonant sensors for proteins
      16. [H] Chuck Neff (Fall 18) – Hydration sensor
      17. Maktoom AlSeiari (Fall 18) – Ion detection with resonant sensors
      18. Rachel Khor (Summer and Fall 18) – Lipase sensor
      19. [H] Mason Furnish (Spring and Fall 18) – Portable reader for Resonant Sensors
      20. Nathan Munn (Spring and Fall 18) - Protein sensing with Resonant Sensors
      21. Alex Kooistra (Spring and Fall 18) – Frugal science XY gantry system
      22. Cameron Greenwalt (Spring 18 Honors Freshman) – CFPS Protocols
      23. Abdul Azizz (Fall 17 and Spring 18) – Low cost detector for SWNT
      24. Austin Allen (Spring 18) – Frugal science syringe pump
      25. [H] Sparsh Agarwal (Spring and Fall 18) – SWNT Fluorescence in EM Field
      26. [H] Erica Peterson (Spring 18) Honors Thesis – “Enzyme Activity Monitoring for Agricultural Applications via Nanotube Technology”
      27. Mazen Abdullah (Spring and Fall 18) – Expression active proteins with CFPS
      28. Ahmed Mansoor (Spring 18) – CFPS Lyophylization
      29. Nate Rider (Griswold Spring and Fall 18) – SPPS on Nanotubes
      30. Samuel Kramer (Spring and Fall 18) – SWNT Chiral separation
      31. Nathan Roby (Spring 18) – Phospholipid solubilized SWNT
      32. Kyle Jackson (Fall 17 and Spring, Fall 18) – Tissue Dielectric Spectroscopy
      33. Lionel Dkhar (Fall 17 and Spring 18) – Electrophoretic chiral separation of SWNT
      34. Jia Wu (Summer 2017 BioMAP REU student) – Ions with Resonant Sensors
      35. Grant Silliman (Summer 2017) – Genetic protocols with Bacillus
      36. Sam Miller (Griswold Fall 2017) – Portable reader for resonant sensors
      37. Suzanna Bart (Fall 2017) – Cell free extract that is devoid of living cells
      38. Joseph Musielewicz\* (Fall 2016 to present) – nIR Reader for Nanotube Sensors
      39. Viktoriia Kriuchkovskaia (Fall 2016 to present) – Low cost optics for nIR sensors / Resonant Sensors for Biofilms
      40. Zhanyi Yao (Spring 2016) – AFM measurements of nanotubes
      41. Brandon Evans (Spring 2016) – Wireless experiment monitors
      42. Tyler Kirscht (Spring 2016) – Frugal Science QCM
      43. Joel Sutter (Spring 2016 to present) – Microscope modifications
      44. Yee Chan (Spring 2016 to present) – Evanescent Wave Illuminator for SWNT
      45. Jacob Rudeen (Spring 2016) – CFPS optimization
      46. Dustin Thomas (Spring 2016 to Aug 2016) – Membranes for Antenna Sensors
      47. Alyssa Lantz (Spring 2016 to present) – Programmable proteases
      48. Andee Beierle (Spring 2016 to present) – Antenna Hydration Sensors
      49. J. Conner Graves (Spring 2016 to 2017) – Raman Spectroscopy of Nanotubes
      50. Trinh Huynh (Summer 2016 to Dec 2017) – Nanotube sonication optimization
      51. Han Jong Shin (Fall 2016 to Dec 2017) – Mouse hibernation chamber / Online cell density measurements / In Field Measurement tools
      52. Megan Otto (Spring 2016) – A Beginner’s Guide to CFPS
  1. Non-ISU Instruction (e.g. Short Courses, Workshops, Training)

[None to date]

1. **INSTITUTIONAL SERVICE**
   1. University-Level Service

- ISU Industry Advisory Committee - Office of Intellectual Property and Technology Transfer – Spring 2020 to present

* 1. College-Level Service

- CBE delegate to College of Engineering International Programs Advisory committee (2018 to present)

* 1. Department-Level Service

- CBE REU program application reviewer – Spring 2020

- Shared Equipment/Course Lab Integration Fall 2018 to Spring 2019

- Graduate Committee Fall 2016 to Present

- Lecturer Search Fall 2017 to Spring 2018 (successful recruiting of Prof. John Kaiser)

1. **PROFESSIONAL SERVICE**
   1. Editorial and Review Service for Manuscripts [during time at ISU]

- Reviewer: Biotechnology Progress

- Reviewer: ACS Synthetic Biology

- Reviewer: Science Advances

- Reviewer: ACS Sensors

- Reviewer: Synthetic and Systems Biology

- Reviewer: Industrial and Engineering Chemistry Research

- Reviewer: Carbon

- Reviewer: PLOS Biology

- Reviewer: Nano Letters (ACS)

- Reviewer: Journal Physical Chemistry

- Reviewer: Nano Letters (ACS)

- Reviewer: Biointerphases (AVS Publication)

- Reviewer: Biosensors and Bioelectronics

- Reviewer: Chemical Physics Letters

- Reviewer: Analytical Chemistry

- Reviewer: Current Opinion in Chemical Biology, Toxicology and Applied Pharmacology

- Reviewer: Biochemical Engineering Journal

- Reviewer: Current Opinion in Chemical Biology

- Reviewer: Microbial Cell Factories

* 1. Service to Professional Societies

- AICHE 2020 theme organizer for 15D, 15C, also session chair in 22B

- ACS 2020 ACS BIO Shark Tank chair

* + AICHE 2019 session chair to divisions 15C, 10D, and 22
  + AICHE NSEF Treasurer and Secretary (2018 to present, elected position)
  + AICHE 2018 15C and 10D Session Chair
  + ACS 2018 BIOT Symposium Co-Chair – Poster Session
  + AICHE 2017 10D Computer Methods in Bio – Co-Chair of 3 sessions
  + AICHE 2017 15C Protein Mechanism Chair
  + AICHE 2017 Undergraduate Student Paper Judge
  + AICHE 2017 Undergrad Poster Judge
  + AICHE 2017 Graduate student Nanobiotechnology Session Judge

* 1. Grant Review Activities

- April 2020 – NSF IIP PFI Sensor Review panel member

- Aug 2019 – NSF IIP PFI Review Panel Member

- April 2019 – NSF IIP PFI-RP Review Panel Member

- November 2018 – Adhoc Reviewer for Army Research Office

- October 2018 - NIH NCI IMAT R21 – Review Panel Member

- April 2018 – ISU Presidential Interdisciplinary Research Initiative Review Panel Member

- January 2018 – NSF CBET Protein Engineering Panel Member

- May 2017 – NSF Fluid Dynamics Ad Hoc Member

* 1. Government, Educational, or Corporate Advisory Committees

- Nov 2019 to Present – BigHat Biosciences Inc. - Scientific advisory board member

- Apr 2020 to Present – Curiosity Inc. - Scientific advisory board member

1. **OUTREACH, COMMUNITY ENGAGEMENT AND OTHER ACTIVITIES**
   1. Outreach Activities

2019 ISU APEX Engineering – Summer program for URM, ‘Tool Development Demo’

2019 SWE StemFest DMACC – ‘Resonant Sensors’

2018 APEX Summer Program – ‘Hydrolytic Enzyme Lab’

2018 SWE Summer University – ‘Chemical Engineers and Enzyme Design’

2017 SWE Summer University – Chemical Engineering Presentation and Hands on Activity, “Design of Experiments for Paint Optimization.”

* 1. Community Engagement Activities
  + Troop 641 and Troop 146 Ames, IA – Assistant Scout Master and Merit Badge Counselor (Fall 2016 to 2018)
  + FIRST Lego League Floor Judge – Jan 2017
  + FIRST Jr. Lego League Coach – Fellows Elementary – Jan 2018 to May 2019