**FACULTY VITA**

Date: 1.08.2019

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, Skroot Laboratory Inc. Nov 2018 to present

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

- Research Investigator (independent PI), DuPont, 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

- Alexander von Humboldt CONNECT Award (2018)

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

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

- ‘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)

- NSF Graduate Fellowship Honorable Mention (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)

- BYU Chemical Engineering Department Outstanding Student Award (2004 -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)

- 1st Place - Engineering Category at NM Regional and State Science Fairs (2002,03)

- 2nd & 3rd - Engineering Category at International Science and Eng. Fair (2002,03)

- Eagle Scout and Order of the Arrow Awards (2003)

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

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

*+ Denotes student co-author.*

*\* Denotes corresponding author*

*[ISU] Denotes paper where work was done at ISU*

* + 1. Articles in Peer-Reviewed Journals – In Print or Accepted
       1. 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*, (2018) doi: 10.1002/bit.26912 [ISU]
       2. 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]
       3. 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]
       4. 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]
       5. 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]
       6. 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]
       7. **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
       8. 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
       9. 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
       10. 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
       11. 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
       12. 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
       13. 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
       14. 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
       15. **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
       16. 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
       17. 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
       18. **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
       19. **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
       20. **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
       21. 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
       22. 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
       23. 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
       24. 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
       25. 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
       26. **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
       27. 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
       28. 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
       29. 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
       30. 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
       31. 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
       32. 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
       33. 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
       1. “Kirigami-enabled, Passive Resonant Sensors for Wireless Deformation Monitoring,” by Sadaf Charkhabi, Yee Jher Chan, Doh-Gyu Hwang, Sean T. Frey, Michael D. Bartlett\*, and Nigel F. Reuel\* under review at *Adv Mat Tech* [ISU]
       2. “Nesting Box Imager: Contact-free, Real-time Measurement of Activity, Body Temperature, and Respiratory Rate applied to Hibernating Mouse Models” by Nathaniel E. Kallmyer, Han Jong Shin, William J. Israelsen, and Nigel F. Reuel under review at *PLOS Biology* [ISU]
    3. Peer-Reviewed Conference Proceedings, Bulletins, or Reports – In Print/Accepted

N/A in Chemical Engineering field.

* + 1. Books and Book Chapters

None.

* + 1. Formally Invited Seminars and Presentations

1. 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.
2. 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.
3. 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
4. 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
5. 3/22/2018 – “Resonant Sensors for Tissue Dielectric Spectroscopy” Baylor College of Medicine Vascular Surgery at VA Hospital, Houston, TX
6. 3/6/2018 – “Wireless, passive, [ultra]low-cost sensors for closed environments” Mechanical Engineering Department graduate seminar, Iowa State University
7. 2/23/2018 – “Prototyping with Pyralux® - Flexible, wireless, passive, resonant sensors for ions, proteins, and motion” DOW Electronics and Imaging Department Seminar, Marlborough, MA
8. 2/22/2018 – “Prototyping with Pyralux® - Flexible, wireless, passive, resonant sensors for ions, proteins, and motion” DuPont Electronics and Imaging Department Seminar, Wilmington, DE
9. 1/12/2018 – “High-Throughput Characterization of Hydrolytic Enzymes in Low Volume and Closed Systems.” PepTalk Protein Engineering Conference, San Diego, CA
10. 11/7/2017 – “Characterization, Control, and Circuit Design of Hydrolytic Enzymes” Chemistry colloquium speaker – Syracuse Chemistry Department
11. 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
5. Nathaniel Kallmyer, Erica Peterson and **Nigel F. Reuel**, “Substrate Functionalized Carbon Nanotubes as a Modular Tool for Tracking Soil Enzyme Activity.” AICHE Annual Meeting. Pittsburgh, PA. Nov 1, 2018.
6. Nathaniel Kallmyer, Trinh Huynh, Joseph Connor Graves, Joseph Musielewicz and **Nigel F. Reuel**, “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.
7. **Nigel Reuel**, “The Startup Method of Managing Large Classes – a Technique Inspired by ASEE Summer School 2017.” AICHE Annual Meeting. Pittsburgh, PA. Oct 29, 2018.
8. **Nigel Reuel,** Sadaf Charkhabi, and Andee Beierle.“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.
9. Charkhabi, S., Jackson, K. and **Reuel, Nigel F.** “Wireless Resonators Proposed for Monitoring Diabetic Foot Ulcers.” Diabetic Lower Extremity Symposium, Boston, MA Nov 2-3, 2017.
10. Charkhabi, S., Beierle, A., and **Reuel, Nigel F.** “Wireless Measurement of Enzymatic Degradation Kinetics with a Resonant Antenna Biosensor.” AICHE Annual Conference, Minneapolis, MN. Oct 30, 2017.
11. Kallmyer, N, and **Reuel, Nigel F.** “Substrate-wrapped Carbon Nanotubes as Enzyme Sensors.” AICHE Annual Conference, Minneapolis, MN. Nov 1, 2017.
12. **Reuel, Nigel**. “Prototyping Proteins and Proteases for Biosensors and Enzyme Responsive Materials.”, ISU Microbiology Graduate Program Interdepartmental Fall Retreat, Oct 19, 2017.
13. **Reuel, Nigel,** and Kallmyer, N. “Carbon Nanotube Based Optical Sensors for Biomanufacturing.” BMES ABioM Meeting, Madison WI, Aug 8, 2017
14. **Reuel, Nigel,** “M-file Toolbox Method of Teaching Numerical Methods to Chemical Engineers.” ASEE Chemical Engineering Faculty Summer School, Raleigh, NC July, 2017
15. **Reuel, Nigel, 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.
16. **Reuel, Nigel 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
17. **Reuel, Nigel F.** and Michael Strano, “Carbon Nanotube Based Optical Sensors for Proteins and Glycans – Applications in Biomanufacturing Process Control.” NIST Panel at Koch Institute, Nov 2012
18. **Reuel, Nigel F.** “Carbon Nanotube Based Optical Sensors for Proteins and Glycans – Applications in Biomanufacturing.” ChemE Department Student Seminar, October 2012
19. **Reuel, Nigel F.**, Jin-Ho Ahn, Jong-Ho Kim, Jingqing Zhang, Arde A. Boghossian, and Michael S. Strano. “Transduction of Glycan-Lectin Binding using Near Infrared Fluorescent Single Walled Carbon Nanotubes for Glycan Profiling.” APS March Meeting, Boston. March, 2012.
20. **Reuel, Nigel F.** “Nanotechnology meets Biology – Advances and Safety.” Invited Talk at MIT EHS, Jan. 2012.
21. **Reuel, Nigel F.**, Jin-Ho Ahn, Jong-Ho Kim, Jingqing Zhang, Arde A. Boghossian, and Michael S. Strano. “Transduction of Glycan-Lectin Binding using Near Infrared Fluorescent Single Walled Carbon Nanotubes for Glycan Profiling.” BioMAN MIT. Boston. 18 Nov. 2011.
22. **Reuel, Nigel F.**, Jin-Ho Ahn, Jong-Ho Kim, Jingqing Zhang, Arde A. Boghossian, and Michael S. Strano. “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.
23. **Reuel, Nigel F**., Jin-Ho Ahn, and Michael S. Strano. “Sweet-Sensing.” MRS Fall Meeting. Boston, 1-3 Dec. 2010.
24. **Reuel, Nigel F**., Jin-Ho Ahn, and Michael S. Strano. “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
25. James, Conrad D; McClain, Jaime L; Achyuthan, Komandoor; Bourdon, Christopher Jay; Rahimian, Kamyar; Galambos, Paul C; Derzon, Mark S; Reuel, Nigel; “A Portable Bead-Based Detection System with Integrated Magnetic Preconcentration and Dielectrophoretic Multichannel Cytometry.” Sandia National Lab Public Report 2008.
26. 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
27. **Reuel, N. F.;** Carr, Adam, “ISURF 04856 Resonant sensors for wireless, online monitoring of cell concentration in biomanufacturing.” (2018) Provisional in process. Optioned by Skroot Laboratory Inc.
28. **Reuel, N. F.;** Charkhabi, Sadaf, “ISURF 04748 Ion Sensing with Multiplex Array of Resonant Sensors.” (2018)
29. **Reuel, N. F.;** Bartlett, Michael; Charkhabi, Sadaf; Hwang, Dohgyu, “ISURF 04747 Kirigami Enabled Resonators for Stretch and Force Sensing and Wireless Power Transfer Switch in Soft Materials.” Disclosure filed to discuss technology at DuPont and DOW (2018)
30. **Reuel, N. F.;** Charkhabi, Sadaf, “ISURF 04749 Wireless Tissue Dielectric Spectroscopy with Resonant Sensors.” Provisional filed (2018).
31. **Reuel, N. F.;** Dopp, Jared, “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)
32. **Reuel, Nigel Forest;** Sadaf Charkhabi, “ISURF 04633 Resonant Frequency Shift Sensors.” Provisional filed (2018)
33. **Reuel, N.F.** Kallmyer, Nathaniel, “ISURF 04667 Optical nanosensors for hydrolytic enzyme characterization.” Provisional filed (2017), patent filed 2019.
34. **Reuel, Nigel Forest;** McAuliffe, Joseph C, “Radio frequency bio-sensor.” US Patent App. 14/872,178 (2015)
35. **Nigel F. Reuel,** Micheal S. Strano, Ramon Wahl, Bernhard Helk, “Method of analysis using array sensor.” US Patent App. 14/017,413 (2014)
36. **Reuel, Nigel F**; Strano, Michael S. “Sensor for detecting analytes.” US Patent App. 14/185,856 (2014)
37. Iverson, Nicole M; Strano, Michael S; **Reuel, Nigel F**; McNicholas, Thomas P. “Near infrared fluorescent single walled carbon nanotubes as tissue localizable biosensors.” US Patent App. 14/488,040 (2014)
38. Strano, Michael S; Ahn, Jin-Ho; Kim, Jong-Ho; Barone, Paul W; **Reuel, Nigel F.** “Nanotube Array for Optical Detection of Protein-Protein Interactions.” US Patent App. 13/222,706 (2012)
39. **Reuel, Nigel;** Lionberger, Troy A; Galambos, Paul C; Okandan, Murat; Baker, Michael S. “Micro-unmanned aerodynamic vehicle.” US Patent 7,341,222 (2008)
    1. Funded Grants and Contracts
40. 09/18 to 09/18 “Developing Flexible Resonator Sensors in an Industry/University Ecosystem.” Nigel F. Reuel (PI). From NSF. $750,000. ($375,000 to NFR).
41. 08/18 to 08/2021 “Resonant Sensors for Monitoring Undercoat Perspiration to Indicate Heat Stress.” Nigel F. Reuel (PI). From DHS Federal Emergency Management Agency (FEMA). $225,000.
42. 09/17 to 09/2020 “Black & Veatch Building a Difference Faculty Faculty Fellow in Engineering.” Nigel F. Reuel (PI). From Black and Veatch. $22,500.
43. 05/17 to 08/17 “Measurement Tool Design Course Preparation.” Nigel F. Reuel (PI). From DuPont Pioneer. $10,000.
44. 06/2016 to present “Equipment Donation for Reuel Lab.” Nigel F. Reuel (PI). From DuPont Central Research. $508,000.
    1. Pending Grants and Contracts
45. 2019 to 2022 “Nanosensors for Characterization of Soil Hydrolytic Activity to Understand Impact of Farm Management Practices on Soil Regenerative Health.” USDA. $500,000.
46. 2019 Sloan Fellowship. Sloan Foundation. $75,000.
47. 2019 NSF IGE, “SMART Program,” at ISU. Co-PI. $500,000.
48. **TEACHING AND STUDENT MENTORING**
    1. Instruction for ISU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Term (most recent first)** | **Course number** | **Course Title** | **Credits** | **Lab** | **Number of students** | **TA/graders** |
| 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

* 1. Supervision of Students as Major Professor

- Adam Carr, PhD, Oct 2018 to present, work in progress

- Nathaniel Kallmyer, PhD, Oct 2016 to present, work in progress

- Sadaf Charkhabi, PhD, Oct 2016 to present, work in progress

- Jared Dopp, M.S. completed, now PhD track, Oct 2016 to present, work in progress

- Denis Tamiev, PhD BBMB, Dec 2016 to present

* 1. Service on Graduate Student Committees

- PhD POSC for Fatima Enam (CBE PhD in 2020)

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

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

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

- Final Thesis Defense committee for Linxiang Yin (PhD BBMB in Dec 2017)

- Final Thesis Defense committee for Jaewook Kim (PhD BBMB in July 2017)

- Grad qualifier for Sujata Senapati (Fall 2016)

- Grad qualifier for Fatima Enam (Fall 2016)

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

[None]

* 1. Supervision of Independent Study and Undergraduate Research

\* Denotes student listed on ISU publication

* + - 1. Juhyung (Ju) Jung (Summer and Fall 18) – Cell Free Protein Synthesis
      2. Sarah Ketcham (Fall 18) – Smart surface resonant sensors for food
      3. Branden Moreau (Fall 18) – Resonant sensors for proteins
      4. Chuck Neff (Fall 18) – Hydration sensor
      5. Maktoom AlSeiari (Fall 18) – Ion detection with resonant sensors
      6. Rachel Khor (Summer and Fall 18) – Lipase sensor
      7. Mason Furnish (Spring and Fall 18) – Portable reader for Resonant Sensors
      8. Nathan Munn (Spring and Fall 18) - Protein sensing with Resonant Sensors
      9. Alex Kooistra (Spring and Fall 18) – Frugal science XY gantry system
      10. Cameron Greenwalt (Spring 18 Honors Freshman) – CFPS Protocols
      11. Abdul Azizz (Fall 17 and Spring 18) – Low cost detector for SWNT
      12. Austin Allen (Spring 18) – Frugal science syringe pump
      13. Sparsh Agarwal (Spring and Fall 18) – SWNT Fluorescence in EM Field
      14. Erica Peterson (Spring 18) Honors Thesis – “Enzyme Activity Monitoring for Agricultural Applications via Nanotube Technology”
      15. Mazen Abdullah (Spring and Fall 18) – Expression active proteins with CFPS
      16. Ahmed Mansoor (Spring 18) – CFPS Lyophylization
      17. Nate Rider (Griswold Spring and Fall 18) – SPPS on Nanotubes
      18. Samuel Kramer (Spring and Fall 18) – SWNT Chiral separation
      19. Nathan Roby (Spring 18) – Phospholipid solubilized SWNT
      20. Kyle Jackson (Fall 17 and Spring, Fall 18) – Tissue Dielectric Spectroscopy
      21. Lionel Dkhar (Fall 17 and Spring 18) – Electrophoretic chiral separation of SWNT
      22. Jia Wu (Summer 2017 BioMAP REU student) – Ions with Resonant Sensors
      23. Grant Silliman (Summer 2017) – Genetic protocols with Bacillus
      24. Sam Miller (Griswold Fall 2017) – Portable reader for resonant sensors
      25. Suzanna Bart (Fall 2017) – Cell free extract that is devoid of living cells
      26. Joseph Musielewicz\* (Fall 2016 to present) – nIR Reader for Nanotube Sensors
      27. Viktoriia Kriuchkovskaia (Fall 2016 to present) – Low cost optics for nIR sensors / Resonant Sensors for Biofilms
      28. Zhanyi Yao (Spring 2016) – AFM measurements of nanotubes
      29. Brandon Evans (Spring 2016) – Wireless experiment monitors
      30. Tyler Kirscht (Spring 2016) – Frugal Science QCM
      31. Joel Sutter (Spring 2016 to present) – Microscope modifications
      32. Yee Chan (Spring 2016 to present) – Evanescent Wave Illuminator for SWNT
      33. Jacob Rudeen (Spring 2016) – CFPS optimization
      34. Dustin Thomas (Spring 2016 to Aug 2016) – Membranes for Antenna Sensors
      35. Alyssa Lantz (Spring 2016 to present) – Programmable proteases
      36. Andee Beierle (Spring 2016 to present) – Antenna Hydration Sensors
      37. J. Conner Graves (Spring 2016 to 2017) – Raman Spectroscopy of Nanotubes
      38. Trinh Huynh (Summer 2016 to Dec 2017) – Nanotube sonication optimization
      39. Han Jong Shin (Fall 2016 to Dec 2017) – Mouse hibernation chamber / Online cell density measurements / In Field Measurement tools
      40. 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

[None to date]

* 1. College-Level Service

- CBE delegate to College of Engineering International Programs Advisory committee

* 1. Department-Level Service

- Shared Equipment/Course Lab Integration Fall 2018 to Present

- Graduate Admission Committee Fall 2016 to Present

- Lecturer Search Fall 2017 to Spring 2018

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

- 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

* 1. Service to Professional Societies
  + 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

- 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

[None to date]

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

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 present