

## Seokheun “Sean” Choi, Ph.D., Professor

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Director, Center for Research in Advanced Sensing Tech. & Environ. Sustain. (CREATES)

(<http://www.ws.binghamton.edu/creates/>)

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### ■ PROFESSIONAL EXPERIENCE

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<b>Professor, The State University of New York (SUNY) at Binghamton</b> Department of Electrical & Computer Engineering	<i>Sep. 2021 - Present</i>
<b>Director, Center for Research in Advanced Sensing Technologies &amp; Environmental Sustainability (CREATES), SUNY Binghamton</b>	<i>Jan. 2020 - Present</i>
<b>Associate Professor, SUNY Binghamton</b> Department of Electrical & Computer Engineering	<i>Sep. 2018 - Aug. 2021</i>
<b>Associate Director, Center for Research in Advanced Sensing Technologies &amp; Environmental Sustainability (CREATES), SUNY Binghamton</b>	<i>Feb. 2016 - Dec. 2019</i>
<b>Assistant Professor, SUNY Binghamton</b> Department of Electrical & Computer Engineering	<i>Sep. 2012 - Aug. 2018</i>
<b>Research Assistant Professor, University of Cincinnati</b> School of Electronic & Computing Systems (The Ohio Center for Microfluidic Innovation) Supervisors: Prof. Jason Heikenfeld and Prof. Chong H. Ahn	<i>Sep. 2011 - Aug. 2012</i>
<b>Research Engineer, LG Chem. Ltd. (Korea)</b> Battery Tech. Center, Research Park	<i>Dec. 2004 - Apr. 2006</i>

### ■ EDUCATION

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<b>Ph.D. Electrical and Energy Engineering, Arizona State University</b> Ira A. Fulton School of Electrical, Computer & Energy Engineering Dissertation: Advancing Microfluidic-Based Protein Biosensor Technology for Use in Clinical Diagnostics Supervisor: Prof. Junseok Chae (Deceased)	<i>Aug. 2007 - Aug. 2011</i>
<b>M.S. Electrical Engineering, Sungkyunkwan University (Korea)</b> School of Information & Communication Engineering, Thesis: Study on the ferroelectric domain using Piezoresponse Force Microscope Supervisor: Prof. Ilsub Chung (Retired)	<i>Mar. 2003 - Aug. 2004</i>
<b>B.S. Electrical Engineering, Sungkyunkwan University (Korea)</b> School of Information & Communication Engineering	<i>Mar. 1996 - Feb. 2003</i> <i>(Military service Apr. 1997 - Jun. 1999)</i>

### ■ AWARDS, GRANTS, AND RECOGNITIONS

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*Dr. Choi has played a significant role as a Principal Investigator (PI) or co-PI in obtaining research grants from various agencies, successfully securing over \$4,000,000 in funding to date. Besides external funding, he has obtained considerable internal funding, amounting to over \$100,000.*

#### **(a) External Funding**

1. **Current** - August 2023 ~ July 2026, **National Science Foundation** – (ECCS #2246975), \$400,000 (**Sole PI**); Stepping Toward Disposable Electronics: Integrated Papertronic Techniques 
2. **Current** - July 2021 ~ June 2024, **Office of Naval Research** (N00014-21-1-2412), \$510,000 (**Sole PI**); Plug-n-Play Micro-Bio-Photovoltaic Panels 

3. **Current** - June 2021 ~ May 2025, **National Science Foundation** – (ECCS #2100757), \$370,000 (**Sole PI**); Rapid, High-Throughput, and Real-time Assessment of Antibiotic Effectiveness against Pathogenic Biofilms 
4. **Current** - August 2020 ~ July 2024, **National Science Foundation** – (ECCS #2020486), \$345,000 (**co-PI, 50% Credit**); Stretchable Papertronics 
5. **Completed** - June 2019 ~ May 2023, **National Science Foundation** – (ECCS #1920979), \$452,581 (**PI, 60% Credit**); Power-on-Skin: Energy Generation from Sweat-Eating Bacteria for Self-Powered Electronic Skins 
6. **Completed** - June 2018 ~ October 2021, **Office of Naval Research** (N00014-18-1-2422), \$510,000 (**Sole PI**); Supercapacitive Micro-Bio-Photovoltaics for Sustainable Wireless Sensor Network 
7. **Completed** - September 2017 ~ August 2020, **National Science Foundation** (ECCS # 1703394), \$315,000 (**Sole PI**); Unlocking the Promise of Bacterial Electrogenerativity 
8. **Completed** - July 2016 ~ Sep. 2020, **National Science Foundation** (BREAD IOS# 1543944), \$867,536 (**co-PI, 20% Credit**); Development and Field Testing of paper-based Biosensors to Increase Productivity of Smallholder Agriculture in Developing Countries  
9. **Completed** - July 2015 ~ June 2018, **National Science Foundation** (ECCS #1503462), \$294,539 (**Sole PI**); An Origami Paper-Based Bacteria-Powered Battery for On-Chip Biosensors 

**(b) Internal Funding**

- SUNY Research Seed Grant to support NSF revised submission (Sole PI) - \$40,000
- The 2020 SUNY COVID-19 Seed Grant - (Co-PI) - \$5,000; Point-of-care assay for COVID-19 immune response
- The 2019-2020 IEEC (Sole PI) - \$25,000; High-Performance Paper PCBs
- The 2019-2020 Smart Energy Transdisciplinary Area of Excellence (PI) - \$15,000; Gut Pathogens
- The 2018-2019 IEEC (Sole PI) - \$50,000; Paper PCBs
- The 2018-2019 Smart Energy Transdisciplinary Area of Excellence (PI) - \$15,000; Bio-solar cells
- The 2017-2018 Smart Energy Transdisciplinary Area of Excellence (PI) - \$15,000; Biobatteries
- The 2015-2016 Health Sciences Transdisciplinary Area of Excellence (Co-PI) - \$15,000; Biosensors
- The 2014-2015 Interdisciplinary Collaboration Grant (PI) - \$15,000; Biological fuel cells
- ADL Small Grant (SUNY Binghamton) 2023 - \$2500; Integrated Papertronic Techniques
- ADL Small Grant (SUNY Binghamton) 2022 - \$2500; Additive Manufacturing of Bacterial Biofilms
- ADL Small Grant (SUNY Binghamton) 2017 - \$2500; Textile-based biobatteries
- ADL Small Grant (SUNY Binghamton) 2016 - \$2500; A VOC sensor
- ADL Small Grant (SUNY Binghamton) 2015 - \$2500; A paper-based biobattery
- ADL Small Grant (SUNY Binghamton) 2013 - \$2500; A micro-sized microbial fuel cell
- 2015 Summer Scholars and Artist's Program Fellowship; \$3000
- 2014 Summer Scholars and Artist's Program Fellowship; \$3000
- 2013 Summer Scholars and Artist's Program Fellowship; \$3000
- S3IP Undergraduate Research Initiative (Feb. 2016); \$2000
- S3IP Undergraduate Research Initiative (Sep. 2014); \$2000
- S3IP Undergraduate Research Initiative (Jan. 2013); \$2000
- Senior Project 2023-2024; \$3,500
- Senior Project 2022-2023; \$3,000
- Senior Project 2021-2022; \$3,000
- Senior Project 2020-2021; \$1,000
- Senior Project 2019-2020; \$1,500
- Senior Project 2016-2017; \$5,000
- Senior Project 2015-2016; \$4,000
- Senior Project 2014-2015; \$5,000
- Senior Project 2013-2014; \$3,500

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-Start-up funding (2012~2014) – \$150,000

### **(c) Honors, Awards, and Recognitions**

- A finalist for the Best Poster Award Competition at the 2024 IEEE MEMS Conference (Topic: Glucose Sensor)
- “The Best Paper Award Winner (First place)” at the 2022 Hilton Head Microsystems Workshop (Topic: Ingestible Biobattery).
- A finalist for the Best Poster Award Competition at the 2022 Hilton Head Microsystems Workshop (Topic: Papertronics).
- Top 2% of the world’s scientist according to the findings of a research conducted at Stanford Univ. (2019, 2020, 2021, 2022); PLOS Biology, “A standardized citation metrics author database annotated for scientific field.”
- 2019-2020 SUNY Chancellor’s Award for Excellence in Scholarship and Creative Activities (2020)
- 2018 Career Champion from The Fleishman Center for Career and Professional Development at BU (2018)
- A finalist for the Best Paper Award Competition (Oral presentation) at the 2018 PowerMEMS (Topic: Supercapacitive Biosolar Cell)
- A finalist for the Best Paper Award Competition (Oral presentation) at the IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE-NANOMED) in 2018 (Topic: Sweat Lactate Sensor)
- A finalist for the Best Paper Award Competition (Oral presentation) at the 2017 IEEE MEMS Conference (Topic: Saliva-activated Biobattery).
- Breakthrough Innovation Award from The New York Academy of Science (2017)
- “Outstanding Reviewer Status” from Biosensors & Bioelectronics Journal (2016)
- NYS/UUP Individual Development Award (2016)
- LG Chem. Ltd.: Technological Achievement Award (2005)

## **■ RESEARCH INTERESTS**

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**Clean Energy and Carbon Capture Techniques:** Biobatteries, Skin-mountable biobatteries, Ingestible biobatteries, Biofuel cells, Microbial fuel cells, Enzymatic fuel cells, Supercapacitive biofuel cells, Biophotovoltaics, Bioelectrochemical systems, Artificial photosynthesis, Biosynthesis, Electromicrobiology, and Artificial Leaf.

**Biosensors:** BioMEMS, Cancer and disease diagnostics, Water quality monitoring, Antimicrobial Susceptibility Testing, Micro-/Nano-technology for chemical/biological analysis, High-throughput sensing arrays, Microfluidics, 3D culturing systems, Point-of-care diagnostic devices, Gas sensors, Disposable biosensors, and Self-powered biosensors.

**Next-Generation Electronics and Robotics:** Papertronics, Flexible and stretchable electronics, Fibertronics, Green electronics, Microbial electronics, Transient electronics, Soft robotics, and Gastrobotics.

**Biomufacturing:** Biosynthesis, Engineered living materials, Electrochemical 3D printing, Designing synthetic microbial communities, and Biofilm fabrication.

## **■ RESEARCH ACCOMPLISHMENTS**

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*Dr. Choi has made significant and pioneering contributions to the discovery, characterization, and understanding of the fundamental properties of exoelectrogens (power-producing microorganisms) and their applications in energy sciences, sensors, and electronics. He is a leading expert in the field of bacteria-powered biobatteries, which have found applications in portable, wearable, and ingestible devices. Additionally, he is at the forefront of developing green and renewable electronic systems, pushing their practical application in disposable IoT devices. His work in papertronics and paperfluidics, as part of green electronics, is advancing towards the creation of self-powered, integrated papertronic biosensors and systems for real-world uses.*

- Choi invented paper-based microbial fuel cells and initiated the field of paper bioenergy (Energy harvesting).  
<https://www.mddionline.com/rd/the-greatest-medtech-innovation-of-2015>  
<https://www.sciencedaily.com/releases/2016/12/161221110606.htm>  
<https://www.sciencedaily.com/releases/2018/08/180808134159.htm>  
<https://theconversation.com/paper-based-electronics-could-fold-biodegrade-and-be-the-basis-for-the-next-generation-of-devices-102759>  
<https://www.batterypoweronline.com/news/releasing-the-potential-of-biobatteries/>
- Choi invented paper-based point-of-care diagnostic devices (Biosensing).  
<https://phys.org/news/2017-09-self-powered-paper-patch-diabetics-glucose.html>

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<https://www.smithsonianmag.com/innovation/spit-powered-biobattery-made-single-sheet-paper-180961973/>  
<https://www.medicaldesignandoutsourcing.com/diagnostic-devices-developing-world/6/>

- Choi invented textile-based biobatteries for smart textiles (Flexible electronics & Energy harvesting).  
<https://www.materialstoday.com/energy/news/stretchable-biobatteries-become-a-reality/>  
<https://www.sciencedaily.com/releases/2017/12/171207114948.htm>  
<https://www.technicaltextile.net/interviews/binghamton-university/lead-researcher/1742-1/>
- Choi pioneered small-scale biophotovoltaic/microbial fuel cells for internet of things (Energy harvesting & IoT).  
<https://phys.org/news/2023-04-tiny-biobattery-potential-year-shelf.html>  
[https://www.asme.org/topics-resources/content/a-self-sustaining-biobattery-keeps-the-juice-flowing?utm\\_source=ME&utm\\_medium=email&utm\\_campaign=08172022\\_ME\\_Newsletter&utm\\_content=SEG0020209&asme promo=MER0027305](https://www.asme.org/topics-resources/content/a-self-sustaining-biobattery-keeps-the-juice-flowing?utm_source=ME&utm_medium=email&utm_campaign=08172022_ME_Newsletter&utm_content=SEG0020209&asme promo=MER0027305)  
[https://www.stle.org/files/TLTArchives/2022/10\\_October/Tech\\_Beat\\_II.aspx?WebsiteKey=a70334df-8659-42fd-a3bd-be406b5b83e5](https://www.stle.org/files/TLTArchives/2022/10_October/Tech_Beat_II.aspx?WebsiteKey=a70334df-8659-42fd-a3bd-be406b5b83e5)  
<https://www.sciencedaily.com/releases/2022/06/220628113358.htm>  
<https://phys.org/news/2017-03-self-sustaining-bacteria-fueled-power-cell.html>  
<https://www.sciencedaily.com/releases/2016/04/160411152653.htm>  
[https://www.solarnovus.com/biological-solar-power-day-and-night\\_N8542.html](https://www.solarnovus.com/biological-solar-power-day-and-night_N8542.html)  
<https://www.binghamton.edu/news/story/2400/new-biosolar-cell-could-power-sensors-for-internet-of-things>
- Choi created biobattery capsules for ingestible electronics (Ingestible electronics & Energy harvesting)  
<https://www.sciencedaily.com/releases/2022/12/221212140604.htm>  
<https://www.bupipedream.com/news/134452/ingestible-bio-battery-developed-by-bu-team/>
- Choi created a new antibiotic susceptibility testing method by using exoelectrogenic electron output (Biosensing).  
<https://phys.org/news/2020-12-device-faster-antibiotic-resistant-bacteria.html>  
<https://www.sciencedaily.com/releases/2020/12/201201084758.htm>
- Choi pioneered Papertronics and Internet of Disposable Things (Electronics).  
<https://www.binghamton.edu/news/story/4800/new-papertronics-offer-biodegradable-alternative-to-traditional-circuits>  
<https://www.wbng.com/2024/03/14/binghamton-university-developes-biodegradable-papertronics/>  
<https://knowridge.com/2024/03/new-biodegradable-papertronics-could-make-traditional-circuits-greener/>  
<https://www.acs.org/content/acs/en/pressroom/newsreleases/2022/october/disposable-electronics-on-a-simple-sheet-of-paper.html>  
<https://newatlas.com/environment/single-use-paper-circuit-board/>  
<https://www.advancedsciencenews.com/wastewater-self-powered-papertronics/>  
<https://www.azom.com/article.aspx?ArticleID=22131>

## ■ COURSES

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*Dr. Choi has created three specialized graduate courses that blend his areas of expertise with the objective of integrating engineering education and research, particularly focusing on attracting more graduate students to the biological aspects of engineering. These courses consist of both theoretical lectures and hands-on laboratory sessions, conducted entirely in his laboratory. Additionally, he has taught two fundamental undergraduate courses, EECE 323: Electromagnetics and EECE 332: Semiconductors, which are essential for electrical engineering students*

**EECE 605** (Fall) – Interfacing Engineering and Biology at Nanoscale (*Developed by Dr. Choi*)

This course covers aspects of bio-molecular function and the interface with synthetic nanomaterials to explore the possibility of devices and systems that are unprecedented in nature. Students will learn the principles of design of biological nanosystems, will be able to critically respond to the engineering issues surrounding the creation of nano-sensors/nano-robots/nano-devices, and will be able to appreciate their potential benefit and impact in health, agricultural, industrial and human environments. This course includes both lectures and hands-on laboratory components.

**EECE 516** (Spring) – Introduction to Bioenergy (*Developed by Dr. Choi*)

This course is an undergraduate senior (4+1 program)/Graduate level course. This course is meant to provide an overview of the field of renewable energy/fuel made available from biologically derived materials with focus on its

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system implementations. In particular, the course will focus on innovative microsystems for bioelectricity, biofuel, biorefinery, and environmental applications. This course includes both lectures and hands-on laboratory components.

**EECE 505** (Fall) – BioMEMS and Bioelectronics (*Developed by Dr. Choi*)

This course is an undergraduate senior (4+1 program)/Graduate level course. This course is meant to provide an overview of the field of bioMEMS, Biosensors and bioelectronics. It will familiarize students with micro/nanofabrication techniques, Lab-on-a-chip, microfluidics, various microfluidic components, biofuel cells, drug delivery, neural interface, and microsystems for cellular studies and tissue engineering. This course includes both lectures and hands-on laboratory components.

**EECE 332** (Fall) – Semiconductor devices

This course is an undergraduate junior/senior level core course for EE (Electrical Engineering) students. This course covers basic theory of semiconductors, p-n junctions, bipolar junction transistors, and MOS field effect devices

**EECE 323** (Spring) – Electromagnetics

This course is an undergraduate junior/senior level core course for EE (Electrical Engineering) students. This course covers fundamentals of electromagnetic fields, Maxwell's equations, plane waves & reflections and application to transmission lines, antennas, propagation, electromagnetic interference, electronics packaging & wireless communication

**EECE 497/499/597/697** – Independent Study

These courses are designed to allow students to work individually with a faculty member on a project or topic of mutual interest.

**EECE 489** – Senior Project

Design projects in cooperation with local industry, other external clients, and university sponsored projects - outlining specifications, proposals, time schedules, and paper designs. Periodic design reviews with client, written and oral progress reports, final presentation. Evaluation based on individual and team performance.

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## ■ PROFESSIONAL ACTIVITIES AND LEADERSHIP

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*Dr. Choi's deep commitment to scholarship is reflected in his active involvement in a range of professional leadership roles across various engineering societies. He has contributed as a reviewer for over 102 publications, including many prestigious ones. His expertise is further recognized through his service on several NSF review panels and his evaluation of numerous international proposals. Additionally, his participation on scientific committees for esteemed conferences exemplifies his scientific leadership within his discipline, underscoring his dedication to advancing his field of research.*

**Proposal Reviewer**

- NSF Review Panel (Career – November 2023)
- NSF Review Panel (Convergence Accelerator – September 2023)
- European Research Council Executive Agency - Proposal review (July 2023)
- French National Research Agency – Proposal review (April 2023)
- NSF Review Panel (ERI - March 2023)
- National Research Foundation (NRF, Singapore) – Proposal Review (November 2021)
- National Institute of Standards and Technology (NIST) – Proposal Review (October 2021)
- NSF proposal Ad hoc review (May 2021)
- Swiss National Science Foundation – Proposal review (July 2018)
- NSF proposal Ad hoc review (Sep. 2018)
- NSF Review Panels (ECCS - Aug. 2018)
- NSF Review Panels (ECCS - Feb. 2018)
- Mitacs Globalink Partnership Award – Proposal review (Oct. 2017, May 2018, & Sep. 2020)
- European Research Council Executive Agency - Proposal review (Sep. 2017)
- Israel Ministry of Science, Technology and Space - Proposal review (Apr. 2017)
- NSF Review Panel (ECCS - Mar. 2017)
- National Science Centre, Poland (2016)
- French National Research Agency – Proposal review (2015)
- NSF Review Panel (ECCS - Feb. 2013)
- India Alliance Fellowship application reviewer (2013)
- NSF Review Panel (ECCS - Nov. 2011)

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**Journal Referee (109 Journals)**

Sep. 2009 - Present

*ACS Applied Materials & Interfaces*; *ACS Biomaterials Science & Engineering*; *ACS Industrial & Engineering Chemistry Research*; *ACS Sensors*; *ACS Sustainable Chemistry & Engineering*; *Acta Biomaterialia*; *Advances in Bioscience and Bioengineering*; *Advanced Materials*; *Advanced Materials Interfaces*; *Advanced Materials Technologies*; *Advanced Electronic Materials*; *Advanced Energy Materials*; *Advanced Functional Materials*; *Advanced Health Materials*; *Advanced Intelligent Systems*; *Advanced NanoBiomed Research*; *Advanced Science*; *Advanced Sustainable Systems*; *Advanced Therapeutics*; *Analytical Chemistry*; *Applied Energy*; *Applied Materials Today*; *Applied Surface Science*; *Batteries*; *Bioresource Technology*; *Bioresource Technology Report*; *Biochemistry and Biotechnology Research*; *Bioelectrochemistry*; ***Biosensors and Bioelectronics***; *Bioinspiration & Biomimetics*; ***Biotechnology Advances***; *Biotechnology Progress*; *Chemical Engineering Journal*; *ChemElectroChem*; *ChemCom*; *ChemSusChem*; *Colloids and Surfaces B: Biointerfaces*; *Computers and Electronics in Agriculture*; *Desalination and Water Treatment*; *Electroanalysis*; *Electrochemistry Communication*; *Electrochimica Acta*; *Energies (MDPI)*; *Energy (Elsevier)*; *Energy & Fuels*; *Environmental Science & Technology letters*; *Enzyme and Microbial Technology*; *Fermentation*; *Frontiers in Mechanical Engineering*; *Frontiers of Energy*; *Frontiers of Optoelectronics*; *Fuel Cells*; *IEEE Sensors*; *IEEE Transactions on Biomedical Engineering*; *International Journal of hydrogen energy*; *International Journal of Environmental Analytical Chemistry*; *International Journal of Energy Research*; *Journal of the Association for Laboratory Automation*; *Journal of Biotechnology*; *Journal of Chemical Technology and Biotechnology*; *Journal of Cleaner Production*; *Journal of Controlled Release*; *Journal of Electrochemical Energy Conversion and Storage (ASME)*; *Journal of Hazardous Materials*; *Journal of Industrial & Engineering Chemistry*; *Journal of Materials Chemistry A*; *Journal of Microbial Biochemical Technology*; *Journal of Microelectromechanical Systems*; *Journal of Micromechanics and Microengineering*; *Journal of the Electrochemical Society*; ***Journal of Power Sources***; *Lab on a Chip*; *Materials Research Bulletin*; ***Materials Today***; *Micro and Nano Letter*; *Micro and Nano Systems Letters*; *Microchemical Journal*; *Microelectronic Engineering*; *Microfluidics and Nanofluidics*; *Micromachines*; ***Microsystems & Nanoengineering (Nature)***; *Microsystem Technologies*; *Molecules*; ***Nano Energy***; *Nanoscale*; *NPJ Flexible Electronics*; ***Nature Communications***; ***Nature Electronics***; ***Nature Sustainability***; ***Nature Water***; *Physical Chemistry Chemical Physics*; *Open Journal of Applied Biosensor*; *PLOS ONE*; ***Progress in Materials Science***; ***Renewable & Sustainable Energy Reviews***; *RSC Advances*; ***Science***; *Science of the Total Environment*; *Scientific Reports*; *Sensors*; *Sensors & Actuators: A. Physical*; *Sensors & Actuators: B. Chemical*; *SLAS Technology*; ***Small***; ***Small Methods***; *Smart Grid & Renewable Energy*; ***Soft Robotics***; *Surface & Coating Technology*; *Technology*; *Trends in Analytical Chemistry (TrAC)*; *Waste Management*

**Journal Editorial Board**

-Guest co-Editor for focus issue on “textile/thread based platforms” in ***Journal of Micromechanics and Microengineering (JMM)*** June. 2023 – Present

-Guest Editor for special issue “Biobatteries: Past, Present, and Future” in ***Batteries*** Sep. 2022 – Feb. 2023

-Guest Editor for special issue “Micro and nano scale sensors, and sensorial systems in bioengineering and biotechnology” in ***Frontiers in Bioengineering & Biotechnology*** May 2020 – Dec. 2020

-Editorial Board Member in ***Applied Nano*** Apr. 2020 - Present

-Editorial Board Member in ***Electronic Materials*** Apr. 2020 - Present

-Editorial Board Member in ***Micromachines*** Aug. 2019 - Present

-Editorial Board Member in ***Robotics*** Feb. 2019 - Present

-Guest Editor for special issue “Biosensing Systems for POC Diagnostics” in ***Sensors*** Nov. 2018 - June 2021

-Guest Editor for special issue “Microbial Fuel Cells” in ***Batteries*** Nov. 2018 – Feb. 2022

-Editorial Board Member in ***Sensors*** Nov. 2018 - Present

-Associate Editor in ***Frontiers in Bioengineering & Biotechnology*** Aug. 2017 - Present

-Guest Editor for special issue “Bio-batteries” in ***Batteries*** May 2017 - Aug. 2018

-Guest Editor for special issue “Micro-/nano-systems for bioengineering and biotechnology” in ***Frontiers in Bioengineering & Biotechnology*** Dec.2016 - Jan.2018

-Editorial Board Member in ***Batteries*** Feb. 2016 - Present

-Editorial Board Member in ***Journal of Applied Biosensor*** Aug. 2012 - Present

-Editorial Board Member in ***Smart Grid & Renewable Energy*** Jan. 2013 - Present

-Editorial Board Member in ***Biosensors Journal*** Dec. 2013 - Present

-Editorial Board Member in ***Advances in Bioscience and Bioengineering*** Oct. 2013 - Dec. 2014

-Editorial Board Member in ***Journal of Biochips & Tissue Chips*** Dec. 2013 - Dec. 2014

**Scientific Committee**

- The 37th IEEE International Conference on Micro Electro Mechanical Systems (***MEMS 2024***): Technical Program Committee and Session Chair (Session XIII – Environmental and Biotechnology Innovations)

- The 22<sup>nd</sup> International Conf. on Micro and Nanotechnology for Power Generation and Energy Conversion Applications (**PowerMEMS 2023**): Technical Program Committee and Awards Committee
- The 22<sup>nd</sup> International Conf. on Solid-State Sensors, Actuators, & Microsystems 2023 (**Transducers 2023**): Technical Program Committee
- The 21<sup>st</sup> International Conf. on Micro and Nanotechnology for Power Generation and Energy Conversion Applications (**PowerMEMS 2022**): Technical Program Committee, Awards Committee, and Session Chair (*Focus Session I – Powering Implantable & Wearables*)
- Bio-Devices 2021 – International Program Committee
- MRS Fall 2021 – Session Organizer/Chair  
SB01: Engineered Functional Multicellular Circuits, Devices & Systems
- IEEE Sensors 2019– Paper Reviewer
- IEEE Engineering in Medicine and Biology Society 2019 – Paper Reviewer
- IEEE Engineering in Medicine and Biology Society 2018 – BioMEMS and Microfluidics Session co-chair
- IEEE Biomedical Circuits and Systems 2018 – Paper Reviewer
- IEEE Sensors 2018 – Paper Reviewer
- IEEE Sensors 2017 – Paper Reviewer
- The 18<sup>th</sup> International Conf. on Solid-State Sensors, Actuators & Microsystems 2015 (*Transducers*) – Session co-chair
- IEEE NEMS 2014 – Session Chair (Micro/Nano Robotics, Assembly and Automation)
- IEEE International Symposium on Mechatronics and Applications (*ISMA 2013*) – Technical Program Committee

#### Member

- IEEE Senior Member
- MRS Member
- ASME Member
- International Society for Microbial Electrochemistry and Technology
- Korean-American Scientists and Engineering Association

### ■ SERVICES

*Dr. Choi has honed vital leadership skills and knowledge crucial for enhancing his research and educational initiatives, significantly contributing to and revitalizing the University's mission. His dedication and enthusiasm to serve, coupled with his leadership through service, stem from his extensive experience in his discipline and profession. This commitment is evidenced by his active involvement in various initiatives and leadership roles within the Department, the College, and the University.*

#### University Services

- Served as a reviewer for the Upstate-Watson Pilot Research Grant Program 2024 Spring
- JIPC (Junior Initiating Personnel Committee) secretary for a 2<sup>nd</sup> year Dean's level review case (ECE) 2023 Fall
- Faculty Search Committee Chair; Analog Electronics (ECE) 2023 Fall – 2024 Spring
- Faculty Search Committee Chair; Analog Electronics (ECE) – Not successful 2022 Fall – 2023 Spring
- Mentoring Two ECE assistant professors Sep. 1, 2022 – Present
- Chairman of Communication & Marketing for Watson College Sep. 1, 2018 – Present  
([Strategic Plans Development for 2020-2021](#))
- Three JIPCs for the BME department 2022 Fall
- University Health Sciences Cluster Hire Team 2022 Spring – 2022 Fall
- Watson Research Visioning Team 2022 Spring
- Faculty Search Committee Chair for two positions; ECE 2021 Fall – 2022 Spring
- SIPC (Senior Initiating Personnel Committee) for the BME department 2021 Fall
- SIPC teaching evaluator for the ECE department 2021 Fall
- Faculty Search Committee; ECE 2020 Fall – 2021 Spring
- JIPC secretary for a tenure/promotion case (ECE) 2019 Fall
- Faculty Senate Sep. 1, 2018 - Aug. 31, 2020
- Mentoring an ECE assistant professor Sep. 1, 2018 – Dec. 1, 2020
- Faculty Search Committee; Power Electronics (ECE) 2017 Fall – 2018 Spring
- Faculty Search Committee; Power Electronics (ECE) – Not successful 2016 Fall – 2017 Spring
- Watson School Committees (Library) Sep. 1, 2014 - Aug. 31, 2016
- ECE Lab space Committee 2015 Fall
- Faculty Advisor for SUNY Chapter of Society Asian Scientists and Engineers (SASE) Sep. 1, 2012 - Present

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- *Serving as a director for Center for Research in Advances sensing Technologies & Environmental Sustainability (CREATES)* Dec. 16, 2019 - Present
  - *Serving as an associate director for CREATES* Feb. 1, 2016 - Dec. 15, 2019
  - *Faculty Member for Center for Autonomous Solar Power (CASP)* 2015 - Present
  - *Faculty Member for Biofilm Research Center (BBRC)* 2018 - Present
  - *Faculty Member Center of Biomanufacturing for Regenerative Medicine (CBRM)* 2018 – Present

### **Synergistic Activities**

- Supervised 1 student from NIRMA University in India through Summer 2019 Internship at BU.
- CREATES: Co-organized “Science-to-Technology Day (S<sup>2</sup>T)” (2016 ~ 2019)
- Supervised 1 undergraduate student (African-American Female) through 2017 LSAMP Summer Research Program.
- Supervised 1 student from Broome Community College through 2017 NSF Research Experiences for Undergraduates (REU) program for Renewable Energy Generation and Storage (NSF#1658990).
- Supervised 1 student from Queensborough Community College through 2015 NSF REU program for Renewable Energy Generation and Storage (NSF#1263004).
- Supervised 1 student (African-American Female) from Russel Sage College through 2014 NSF REU program for Renewable Energy Generation and Storage (NSF#1263004).
- Supervised 1 undergraduate student through 2014 McNair Summer Research Program.
- Supervised 2 undergraduate student through 2013 and 2014 S3IP Undergraduate Research Initiative
- Offered Undergraduate Bioenergy Research Program (2012 ~ 2022) – supervised 50 undergraduate students.
- Offered Summer High School Research Program (2014 ~ 2017) – supervised 4 high school students (They won prestigious awards in numerous research competitions)
- Developed new graduate courses; BioMEMS and Bioelectronics (EECE 505), Introduction to Bioenergy (EECE 516), and Interfacing Engineering and Biology at Nanoscale (EECE 605).

### **■ DIVERSITY, EQUITY, & INCLUSION ACTIVITIES**

*Dr. Choi has had the honor of interacting with a diverse range of SUNY Binghamton stakeholders, including faculty, staff, advisory board members, sponsors, partners, and most importantly, students. These interactions have provided him with a deep understanding of the unique initiatives SUNY Binghamton undertakes to promote diversity, equity, and inclusion (DEI). He has also become acutely aware of the existing gaps that need to be addressed to fulfill our commitment to DEI and social justice. Collaboratively with other SUNY constituents, he has been involved in evaluating campus climate data, exploring research on effective DEI practices, launching initiatives to attract and retain students, and enhancing DEI visibility through our website, among other significant efforts.*

**Mentoring:** Dr. Choi has effectively mentored a diverse group of students, including two African-American undergraduate female scientists and over 50 undergraduates, of whom 11 are female. This mentorship has been supported through various programs, such as the Summer Scholars and Artists Program (2013-2015), the S3IP Undergraduate Research Initiative Program (2013, 2014, 2016), the McNair Summer Research Program (2014), the NSF REU program (2014, 2015, 2017), and the Louis Stokes Alliances for Minority Participation summer program (2017).

**Service:** Dr. Choi currently serves as the Faculty Advisor for the SUNY Chapter of the Society of Asian Scientists and Engineers (SASE) (<https://www.binghamton.edu/watson/about/student-groups.html#SASE>). SASE focuses on the advancement of Asian heritage scientists and engineers in both academic and professional realms. More information about SASE at SUNY Binghamton can be found at SASE Binghamton.

**Outreach:** Dr. Choi's outreach endeavors concentrate on K-12 science education. His initiatives include mentoring high school students in their science projects and engaging in various national and state competitions. A notable collaboration with a local high school has allowed students to delve into advanced science and technology at SUNY Binghamton. His research, which involves creating biobatteries and biosensors, has sparked interest among high school students aspiring to pursue degrees in engineering or science. In this vein, he has mentored four high school students to notable success in prestigious research competitions, such as the Intel International Science & Engineering Fair, the Long Island Science & Engineering Fair, the New York State Science & Engineering Fair, and others. Two of these mentored high school students have also contributed to journal and conference publications under his guidance.



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■ **PUBLICATIONS** (>180 refereed publications & >100 journal publications; Citations: 4857; H-index: 41; i10-index: 90)

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### **Pioneering Techniques: A Milestone in Research Publications:**

1. The first paper-based biobattery: "A paper-based microbial fuel cell: instant battery for disposable diagnostic devices," *Biosensors & Bioelectronics*, 49, 410, 2013.
2. The first self-powered paper-based glucose monitoring: "A 3D paper-based enzymatic fuel cell for self-powered, low-cost glucose monitoring," *Biosensors & Bioelectronics*, 79, 193-197, 2016.
3. The first microscale biological solar cell: "A micro-sized biosolar cell for self-sustaining power generation," *Lab Chip*, 15, 391-398, 2015.
4. The first textile-based biobattery: "Flexible and stretchable biobatteries: monolithic integration of membrane-free MFCs in a single textile layer," *Advanced Energy Materials*, 8, 1702261, 2018.
5. The first cellular self-charging supercapacitor: "A self-charging cyanobacterial supercapacitor," *Biosensors & Bioelectronics*, 140, 11354, 2019.
6. The first high-throughput microbial fuel cell array: "A 96-well high-throughput, rapid-screening platform of extracellular electron transfer in MFCs," *Biosensors & Bioelectronics*, 162, 112259, 2020.
7. The first wearable biobattery: "Power-on-skin: electricity generation from sweat-eating bacteria for self-powered e-skins," *Nano Energy*, 75, 104994, 2020.
8. The first paper-based robotics: "Paper Robotics: self-folding, gripping, and locomotion," *Advanced Materials Technologies*, 5, 1901054, 2020.
9. The first characterization of electrogenic gut bacteria: "Characterization of electrogenic gut bacteria," *ACS Omega*, 5, 29439, 2020.
10. The first antibiotic susceptibility testing method by using exoelectrogenic electron output: "A simple, inexpensive, & rapid method to assess antibiotic effectiveness," *Biosensors & Bioelectronics*, 168, 112518, 2020.
11. The first spatial engineering of microbial consortium for bioenergy: "Spatial engineering of microbial consortium for long-lasting, self-sustaining, & high-power generation," *Advanced Energy Materials*, 11, 2100713, 2021.
12. The first spore-forming microbial fuel cell: "Bioelectricity Production from Sweat-Activated Germination of Bacterial Endospores," *Biosensors and Bioelectronics*, 186, 113293, 2021
13. The first integrated papertronics: "Integrated Papertronic Techniques on a Single Sheet of Paper," *ACS Appl. Mater. Interfaces*, 14, 45658-45668, 2022
14. The first biobattery activated via human bodily fluids: "Small-scale, Storable Paper Biobatteries Activated Via Human Bodily Fluids," *Nano Energy*, 97, 107227, 2022
15. The first ingestible biobattery capsule: "A battery capsule for ingestible electronics in the small intestine," *Advanced Energy Materials*, 13, 2202581, 2023
16. The first biobattery chip: "Integrating Renewable Microbial Fuel Cells in Dual In-Line Package for Chip-on-Board-Circuits," *Advanced Materials Technologies*, 8, 2301035, 2023
17. The first electrochemical 3D printing of living bacteria: "Electrochemical Additive Manufacturing of Living Bioelectrodes Having Intimate Electronic Couplings between Exoelectrogens and Electrodes," *Advanced Engineering Materials*, 25, 2301137, 2023
18. The first green, tunable integrated papertronics: Revolutionizing Papertronics: Advanced Green, Tunable, and Flexible Components and Circuits," *Advanced Sustainable Systems*, In-print, 2024

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## REFEREED JOURNAL ARTICLES:

### 2024

1. Z. Rafiee, A. Elhadad, and **S. Choi**, “Revolutionizing Papertronics: Advanced Green, Tunable, and Flexible Components and Circuits,” *Advanced Sustainable Systems*, In-print, 2024 (IF 7.1) (Featured on the Front Cover) *This work was reported by WBNG news, Electronics For You, Tech Xplore, Knowridge, Mirage, etc.*
2. Y. Gao, A. Elhadad, and **S. Choi**, “Janus Paper-based Wound Dressings for Effective Exudate Absorption and Antibiotic Delivery,” *Advanced Engineering Materials*, in-print, 2024 (IF 4.1)
3. J.S. Dorsainvil, M.S. Brown, Z. Rafiee, A. Elhadad, **S. Choi**, and A. Koh, “Cellulosic nanofibers utilizing a silicone elastomeric core to form stretchable paper,” *Advanced Materials Interfaces*, 11, 2300487, 2024 (IF 5.4)
4. M. Rezaie, Z. Rafiee, and **S. Choi**, “A Transient Spore-forming Microbial Fuel Cell with Extracellularly Biosynthesized Tin Oxide Nanoparticles for Powering Disposable and Green Papertronics,” *Advanced Sustainable Systems*, 8, 2300357, 2024 (IF 7.1)

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5. A. Elhadad, and **S. Choi**, “Electrochemical Additive Manufacturing of Living Bioelectrodes Having Intimate Electronic Couplings between Exoelectrogens and Electrodes,” *Advanced Engineering Materials*, 25, 2301137, 2023 (IF 4.1)
6. A. Elhadad, Y. Gao, and **S. Choi**, “Integrating Renewable Microbial Fuel Cells in Dual In-Line Package for Chip-On-Board Circuits,” *Advanced Materials Technologies*, 8, 2301035, 2023 (IF 6.8)
7. A. Elhadad, and **S. Choi**, “Powering the Internet of Things in Aquatic Environments: Solar Energy Harvesting Through a Buoyant Biosolar Cell Array,” *Journal of Power Sources*, 581, 233501, 2023 (IF 9.2)
8. Y. Gao, and **S. Choi**, “Micropatternable Janus Paper as a Wearable Skin Patch for Sweat Collection and Analysis,” *Advanced Materials Technologies*, 8, 2300396, 2023 (IF 6.8)
9. Z. Rafiee, and **S. Choi**, “All-Electrical Antibiotic Susceptibility and Resistance Profiling of Electrogenic *Pseudomonas aeruginosa*,” *Analyst*, 148, 2501-2510, 2023 (IF 4.2) (Featured in HOT 2023 Topics)
10. M. Rezaie, and **S. Choi**, “Moisture-Enabled Germination of Heat-Activated Bacillus Endospores for Rapid and Practical Bioelectricity Generation: Toward Portable, Storable Bacteria-Powered Biobatteries,” *Small*, 19, 2301135, 2023 (IF 15.153) *This work was reported by Phys.org, News Break, Newswise, Science Times, Azonano, etc.*
11. **S. Choi**, “Biofuel cells and Biobatteries: Misconceptions, Opportunities, and Challenges,” *Batteries*, 9, 119, 2023 (IF 4.0). *Special Issue: Biobatteries - Past, Present, and Future.*
12. M. Rezaie, Z. Rafiee, and **S. Choi**, “A Biobattery Capsule for Ingestible Electronics in the Small Intestine: Biopower Production from Intestinal Fluids Activated Germination of Exoelectrogenic Bacterial Endospores,” *Advanced Energy Materials*, 13, 2202581, 2023 (IF 27.8) *This work was featured by ScienceDaily, Interesting Engineering, Newswise, Flipboard, etc.*

### 2022

13. Y. Gao, M. Rezaie, and **S. Choi**, “A Wearable, Disposable Paper-based Self-Charging Power System Integrating Sweat-driven Microbial Energy Harvesting and Energy Storage Devices,” *Nano Energy*, 104, 107923, 2023 (IF 19.096)
14. M. Landers, A. Elhadad, M. Rezaie, and **S. Choi**, “Integrated Papertronic Techniques: Highly Customizable Resistor, Supercapacitor, and Transistor Circuitry on a Single Sheet of Paper,” *ACS Applied Materials & Interfaces*, 14, 45658-45668, 2022 (IF 10.383) *This work was featured by ACS, ScienceDaily, E&T Magazine, Inceptive Mind, EurekAlert, Printed Electronics World, AZoM, New Atlas, etc.*
15. A. Elhadad, and **S. Choi**, “Biofabrication and Characterization of Multispecies Electroactive Biofilms in Stratified Paper-based Scaffolds,” *Analyst*, 147, 4082-4091, 2022 (IF 5.227)
16. Z. Rafiee, M. Rezaie, and **S. Choi**, “Accelerated antibiotic susceptibility testing of *Pseudomonas aeruginosa* by monitoring extracellular electron transfer on a 3-D paper-based cell culture platform,” *Biosensors and Bioelectronics*, 216, 114604, 2022 (IF 12.545)
17. A. Elhadad, L. Liu, **S. Choi**, “Plug-and-Play Modular Biobatteries with Microbial Consortia,” *Journal of Power Sources*, 535, 231487, 2022 (IF 9.794) *This work was featured by ScienceDaily, Technology Networks, Interesting Engineering, Tech Xplore, Inceptive Mind, Mirage News, Inavate, ASME, STLE, etc.*
18. M. Landers, and **S. Choi**, “Small-scale, Storable Paper Biobatteries Activated Via Human Bodily Fluids,” *Nano Energy*, 97, 107227, 2022 (IF 19.096)
19. J. Ryu, M. Landers, and **S. Choi**, “A Sweat-Activated, Wearable Microbial Fuel Cell for Long-term, On-demand Power Generation,” *Biosensors and Bioelectronics*, 205, 114128, 2022 (IF 12.545)

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24. L. Liu, and **S. Choi**, “Miniature Microbial Solar Cells to Power Wireless Sensor Networks,” *Biosensors and Bioelectronics*, 177, 112970, 2021 (IF 12.545)
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29. M. Tahernia, M. Mohammadifar, L. Liu, and **S. Choi**, “A Disposable, Papertronic Three-Electrode Potentiostat for Monitoring Bacterial Electrochemical Activity,” *ACS Omega*, 5, 24717-24723, 2020 (IF 3.5) (Featured on the Front Cover)
30. M. Tahernia, M. Mohammadifar, D.J. Hassett, and **S. Choi**, “A portable papertronic sensing system for rapid, high-throughput, and visual screening of bacterial electrogenicity,” *Biosensors and Bioelectronics*, 165, 112348, 2020 (IF 10.6)
31. M. Mohammadifar, M. Tahernia, J.H. Yang, A. Koh, and **S. Choi**, “Biopower-on-Skin: Electricity Generation from Sweat-Eating Bacteria for Self-Powered E-Skins,” *Nano Energy*, 75, 104994, 2020 (IF 17.9)
32. J.H. Cho, Y. Gao, J. Ryu, **S. Choi**, “A portable, disposable, paper-based microbial fuel cell sensor utilizing freeze-dried bacteria for in-situ water quality monitoring,” *ACS Omega*, 5 (23), 13940-13947, 2020 (IF 3.5)
33. M. Tahernia, M. Mohammadifar, Y. Gao, W. Panmanee, D.J. Hassett, and **S. Choi**, “A 96-Well High-Throughput, Rapid-Screening Platform of Extracellular Electron Transfer in Microbial Fuel Cells,” *Biosensors and Bioelectronics*, 162, 112259, 2020 (IF 10.6)
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36. J. Ryu, M. Mohammadifar, M. Tahernia, H. Chun, Y. Gao, and **S. Choi**, “Paper Robotics: Self-folding, Gripping, and Locomotion,” *Advanced Materials Technologies*, 5, 1901054, 2020 (IF 7.8) - *This work has appeared in Hot Topics: Robotics.*
37. M. Tahernia, M. Mohammadifar, and **S. Choi**, “Paper-supported High-throughput 3-D Culturing, Trapping, and Monitoring of *Caenorhabditis Elegans*,” *Micromachines*, Special Issue: 10th Anniversary of Micromachines, 11, 99 (Invited) (IF 2.9)
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40. M. Tahernia, M. Mohammadifar, D.J. Hassett, and **S. Choi**, “A fully disposable 64-well papertronic sensing array for screening electroactive microorganisms” *Nano Energy*, 65, 104026, 2019 (IF 16.6)
41. L. Liu, and **S. Choi**, “A Self-Charging Cyanobacterial Supercapacitor” *Biosensors and Bioelectronics*, 140, 11354, 2019 (IF 10.3)

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  44. Y. Gao, M. Mohammadifar, and **S. Choi**, “From microbial fuel cells to Biobatteries: Moving toward on-demand micro-power generation for Small-scale Single-Use Applications,” Progress Report (Invited), *Advanced Materials Technologies*, 4, 1970039, 2019 (**IF 6.0**) (*Featured on the Inside Back Cover*)
  45. K.K. Lee, M. Kim, and **S. Choi**, “A whole blood sample-to-answer polymer lab-on-a-chip with superhydrophilic surface toward point-of-care technology,” *Journal of Pharmaceutical and Biomedical Analysis*, 162, pp.28-33, 2019 (**IF 3.3**)

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46. M. Mohammadifar, I. Yazgan, J. Zhang, V. Kariuki, O. Sadik, and **S. Choi**, “Green Biobatteries: Hybrid Paper-Polymer Microbial Fuel Cells,” *Advanced Sustainable Systems*, 2 1800041, 2018. (**IF 4.9**) (*Top 10% the most Downloaded Articles from Wiley as of Apr. 2020*). *This work was featured by ScienceDaily, newswise, nanowork, Techxplora, EreAlert, etc.*
47. Y. Gao and **S. Choi**, “Merging Electric Bacteria with Paper,” *Advanced Materials Technologies*, 3, 1800118, 2018. (**IF 5.4**)
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49. I. Yazgan, J. Zhang, V. Kariuki, A. Akgul, L.E. Cronmiller, A. Akgul, F. Osonga, A. McMahon, Y. Gao, G. Eshun, **S. Choi**, and O. Sadik, “Selective sensing and Imaging of Penicillium italicum spores and hyphae using carbohydrate-lectin interactions,” *ACS Sensors*, 3, 648-654, 2018 (**IF 6.9**)
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51. S. Pang, Y. Gao, and **S. Choi**, “Flexible and Stretchable Microbial Fuel Cells with Modified Conductive and Hydrophilic Textile,” *Biosensors and Bioelectronics*, 100, 504-511, 2018 (**IF 9.5**)
52. S. Pang, Y. Gao, and **S. Choi**, “Flexible and Stretchable Biobatteries: Monolithic Integration of Membrane-free Microbial Fuel Cells in a Single Textile Layer,” *Advanced Energy Materials*, 8, 1702261, 2018 (**IF 24.8**) - *This work was highlighted by ScienceDaily, Newswise, Techxplora, EreAlert, etc.*

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## **REFEREED CONFERNECE PROCEEDINGS:**

### **2024**

1. Y. "Lexi" Gao, A. Elhadad, and **S. Choi**, "Paper-based wearable moist-electric generators with efficient atmospheric water capture," *Hilton Head Workshop 2024: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 2 - 6, 2024, Hilton Head Island, SC, USA, in print. (**Oral Presentation**)
2. Z. Rafiee, M. Rezaie, and **S. Choi**, "Advanced Paper-based Organic Electrochemical Transistors: A novel approach for rapid point-of-care antibiotic susceptibility testing," *Hilton Head Workshop 2024: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 2 - 6, 2024, Hilton Head Island, SC, USA, in print.
3. M. Rezaie, and **S. Choi**, "Probiotic-powered Ingestible Capsules: A novel approach to vibrational therapy," *Hilton Head Workshop 2024: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 2 - 6, 2024, Hilton Head Island, SC, USA, in print.
4. A. Elhadad, Y. Gao, and **S. Choi**, "A microfabricated gastrobot for sustainable on-water propulsion," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, Jan. 21 - 25, 2024, Austin, Texas, pp. 497-500.
5. Y. Gao, A. Elhadad, and **S. Choi**, "Bacterial endospore based wearable biosensors for selective and sensitive glucose monitoring," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, Jan. 21 - 25, 2024, Austin, Texas, pp. 402-405. (*This paper has been selected as a finalist for the Best Poster Award Competition*)
6. Y. Gao, and **S. Choi**, "Paper-based moist-electric generators for scalable, disposable, and green power generation," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, Jan. 21 - 25, 2024, Austin, Texas, pp. 741-744.
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9. A. Elhadad, M. Rezaie, and **S. Choi**, "A Buoyant Bio-solar Cell Array with Long-Lasting High-Power Output: Energy Harvesting from Aquatic Environments," *PowerMEMS 2022: The 21st International Conference on Micro and Nanotechnology for Power Generation and Energy Conversion Applications*, Dec. 12-15, 2022, Salt Lake City, UT, USA, pp. 126-129. (**Oral Presentation**)
10. M. Rezaie, A. Elhadad, and **S. Choi**, "Stackable, Storage, Millimeter-Scale Biobatteries Having High Instantaneous Power Output," *PowerMEMS 2022: The 21st International Conference on Micro and Nanotechnology for Power Generation and Energy Conversion Applications*, Dec. 12-15, 2022, Salt Lake City, UT, USA, pp. 237-240.
11. A. Elhadad, and **S. Choi**, "3-D Printed Redox-active Organic Electrodes to Bridge across Biology and Electronics," *Hilton Head Workshop 2022: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 5 - June 9, 2022, Hilton Head Island, SC, USA, pp. 282-283 (**Late News**).
12. M. Landers, A. Elhadad, and **S. Choi**, "Papertronics: Fully Paper-Integrated Resistor, Capacitor, and Transistor Circuits," *Hilton Head Workshop 2022: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 5 - June 9, 2022, Hilton Head Island, SC, USA, pp. 419-422 (*This paper has been selected as a finalist for the Best Poster Award Competition*).
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  22. L. Liu, and **S. Choi**, "A cyanobacterial artificial leaf for simultaneous carbon dioxide reduction and bioelectricity generation," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, Jan. 18 - 22, 2020, Vancouver, Canada, pp. 1071-1074
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  35. M. Mohammadifar and **S. Choi**, "Transient Biobatteries: Microfluidic control for programmable dissolution," *Hilton Head Workshop 2016: A Solid-state Sensors, Actuators and Microsystems Workshop*, Jun. 3- 7th, 2018, Hilton Head Island, SC, USA, pp. 171-174.

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42. L. Liu, and **S. Choi**, "A paper-based microfluidic platform for photosynthetic bioelectricity generation" *MicroTAS 2017*, Oct. 22- 26, 2017, Savannah, GA, USA, pp. 1423-1424
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#### **2014**

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#### **2013**

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#### **Previous – 2012 (Non SUNY Binghamton)**

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77. **S. Choi**, S. Mukherjee, S. Su, W. Panmanee, R.T. Irvin, and D.J. Hassett, "A 1.5  $\mu$ L Microbial fuel cell array for rapid screening of exoelectrogenic bacteria," *Hilton Head Workshop 2012: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 3-7<sup>th</sup>, 2012, Hilton Head Island, SC, USA, pp. 169 – 172.
78. **S. Choi**, & J. Chae, " $\mu$ L-scale microbial fuel cell with optimal power generation and biofilm formation," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, Jan. 29 - Feb. 3, 2012, Paris, France, pp. 43 – 46. (**Oral presentation**)
79. **S. Choi**, A. Lajevardi-Khosh & J. Chae, "Pattern generation of microfluidic-based biosensor to detect C-reactive protein using competitive protein adsorption," *The 16th International Conference on Solid-State Sensors, Actuators and Microsystems*, June 5-9<sup>th</sup>, 2011, Beijing, China, pp. 2223-2226.
80. **S. Choi**, & J. Chae, "A Series array of microliter-sized microbial fuel cell," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, January 23-27<sup>th</sup>, 2011, Cancun, Mexico, pp.1289-1292.
81. **S. Choi**, H.-S. Lee, Y. Yang, B. E. Rittmann & J. Chae, "A High power density MEMS microbial fuel cell," *Hilton Head Workshop 2010: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 1-5<sup>th</sup>, 2010, Hilton Head Island, SC, USA, pp. 82-85. (**Oral presentation**)
82. **S. Choi**, & J. Chae, "Thyroglobulin Detection Using Competitive Protein Adsorption," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, January 24-28<sup>th</sup>, 2010, Hong Kong, China, pp. 887-890.
83. **S. Choi**, W. Xu, X. Zhang & J. Chae, "Characterization of a High-Q in-liquid Longitudinal-Mode Film Bulk Acoustic Resonator for Real-time In-situ monitoring of Competitive Protein Adsorption," *IEEE International Conference on Micro-Electro-Mechanical-Systems (MEMS)*, January 24-28<sup>th</sup>, 2010, Hong Kong, China, pp. 739-742.
84. **S. Choi**, & J. Chae, "A Simple Interfacial design of Biomolecules to nano/micro-devices for highly Sensitive and Selective Protein Detection," *ASME International Mechanical Engineering Congress & Exposition*, November 13-19<sup>th</sup>, 2009, Lake Buena Vista, Florida, pp. 811-814.
85. **S. Choi**, & J. Chae, "A Regenerative biosensing Surface Using Electrochemical Desorption of Self- assembled Monolayer in Microfluidics," *International Conference on Solid-State Sensors and Actuators (Transducers)*, June 21-25<sup>th</sup>, 2009, Denver, CO, pp.943-946.
86. **S. Choi**, & J. Chae, "Surface Plasmon Resonance Biosensor based on Vroman Effect: Towards Cancer Biomarker Detection," *15<sup>th</sup> IEEE International Mixed-Signals, Sensors, and Systems Test Workshop (IMS3TW'09)*, June 10-12<sup>th</sup>, 2009, Scottsdale, Arizona, no. 5158683.
87. **S. Choi**, & J. Chae, "A New Reconfigurable Biosensor Technique in a Microfluidic System," *IMAPS International Conference and Exhibition on Device Packaging*, March 9-12<sup>th</sup>, 2009, Scottsdale, Arizona, USA, pp. 2965-2989.
88. **S. Choi**, Y. Yang, & J. Chae, "A Real-time Protein Detector Utilizing the Vroman Effect on SAM-Functionalized Surfaces," *Hilton Head Workshop 2008: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 1-5<sup>th</sup>, 2008, Hilton Head Island, SC, USA, pp. 138-141.
89. J. Heo, **S. Choi**, & I. Chung, "Characterization of Electrical Properties and Gating Effect of Single Wall Carbon Nanotube Field Effect Transistor," *The 11<sup>th</sup> Korean Conference on Semiconductors*, February 19-20<sup>th</sup>, 2004, Muju, Korea, PP. 169-172.

#### **CONFERENCE/WORKSHOP/SEMINAR PRESENTATIONS:**

1. Z. Rafiee, & **S. Choi**, "Rapid and Simple Antibiotic Susceptibility Testing by Monitoring Bacterial Extracellular Electron Transfer," *2021 MRS Fall Meeting and Exhibit*, Dec. 6-8 (Virtual), Boston, MA, USA (**Oral presentation**)
2. M. Landers, & **S. Choi**, "On-demand Paper Biobatteries Activated by Human Body Fluids," *2021 MRS Fall Meeting and Exhibit*, Dec. 6-8 (Virtual), Boston, MA, USA (**Oral presentation**)
3. A. Elhadad, & **S. Choi**, "Paper-supported 3-D Cell Culturing, Sensing, and Biofabrication," *2021 MRS Fall Meeting and Exhibit*, Dec. 6-8 (Virtual), Boston, MA, USA (**Oral presentation**)
4. Yang Gao, & **S. Choi**, "3-D Printed Conductive Bacterial Composite Films," *2019 MRS Fall Meeting and Exhibit*, Dec. 1st - 6th, Boston, MA, USA (**Oral presentation**)
5. Yang Gao, Jihyun Ryu & **S. Choi**, "A Yarn-based Microbial Fuel Cell," *2019 MRS Fall Meeting and Exhibit*, Dec. 1st - 6th, Boston, MA, USA (**Oral presentation**)
6. Jonghyun Cho, M. Tahernia, Y. Gao, & **S. Choi**, "A Portable, Single-use, Paper-based Microbial Fuel Cell Sensor for Rapid, On-site, Water Quality Monitoring," *2019 MRS Fall Meeting and Exhibit*, Dec. 1st - 6th, Boston, MA, USA (**Oral presentation**)
7. Jihyun Ryu, M. Tahernia, M. Mohammadifar, C. Hail & **S. Choi**, "A Water Activated Switch Using a Kirigami-inspired Robotic Finger," *2019 MRS Fall Meeting and Exhibit*, Dec. 1st - 6th, Boston, MA, USA

8. Y. Gao, L. S. Thomas, M. R. Oefelein, L. C. Cook and **S. Choi**, "Electrogenic Capabilities of Gut Bacteria," *American Society for Microbiology (ASM) Microbe 2019*, June 20~24, 2019, San Francisco, CA, USA.
9. M. Mohammadifar, M. Tahernia, and S. Choi, "Electricity Generation from Sweat-Eating Bacteria," *American Society for Microbiology (ASM) Microbe 2019*, June 20~24, 2019, San Francisco, CA, USA.
10. M. Tahernia, M. Mohammadifar, **S. Choi**, "A 3-D multilayer paper printed circuit board," *The 30<sup>th</sup> Annual Electronics Packaging Symposium*, Sep. 18~19, 2018, Binghamton, NY, USA.
11. M. Tahernia, M. Mohammadifar, **S. Choi**, "Spray-coated PEDOT:PSS/Graphene Circuit Boards on Paper," *The 30<sup>th</sup> Annual Electronics Packaging Symposium*, Sep. 18~19, 2018, Binghamton, NY, USA.
12. Y. Gao and **S. Choi**, "A disposable microbial battery pack for point-of-care testing in resource-limited settings" *IEEE-NIH 2017*, Nov. 6-8, 2017, Bethesda, MD, USA.
13. M. Mohammadifar, and **S. Choi**, "A self-powered paper-based microbial sensor for lactate monitoring in sweat," *IEEE-NIH 2017*, Nov. 6-8, 2017, Bethesda, MD, USA.
14. **S. Choi**, "Powering Point-of-care Diagnostic Devices: On-demand Bio-Power Generation," 2nd Microfluidics Congress: USA, July 25th~26th, Philadelphia, USA, 2017
15. L. Kwan, A. Fraiwan and **S. Choi**, "A paper-based biofuel cell," NSF REU Program, July 30, Binghamton, NY, USA, 2015
16. T. Beebe, A. Fraiwan, and **S. Choi**, "A microfluidic platform for real time sensing and characterization of electroactive biofilms," NSF REU Program, July 30, Binghamton, NY, USA, 2014
17. J. Lu and **S. Choi**, "A micro-sized microbial fuel cell-based biosensor for fast and sensitive detection of toxic substances in water," McNair Summer Research Program, July 20, Buffalo, NY, USA, 2014
18. D. Han, **S. Choi**, D. Hassett, A. Steckle, "Porous Electrospun Nanofiber Membrane Electrode for Enhancing Power Density of Micro-sized MFC," *Advances in Microfluidics & Nanofluidics*, May 24-26, South Bend, Indiana, USA, 2013
19. S. Sundermier, A. Fraiwan and **S. Choi**, "Laminar Flow based microbial fuel cells," *Advances in Microfluidics & Nanofluidics*, May 24-26, South Bend, Indiana, USA, 2013

#### Previous – 2012 (Non SUNY Binghamton)

20. J. Chae, W. Xu, & **S. Choi**, "MEMS FBAR (Film Bulk Acoustic Resonator) for Real Time In-Situ Monitoring of Competitive Protein Adsorption," *IBE (The Institute of Biological Engineering) 2010 Annual conference*, March 4-6<sup>th</sup>, 2010, Cambridge, MA, USA
21. J. Chae & **S. Choi**, "Detecting a target molecule using competitive adsorption and exchange of proteins," *IBE, 2010 Annual conference*, March 4-6<sup>th</sup>, 2010, Cambridge, MA, USA
22. **S. Choi**, & J. Chae, "A New Protein Sensor Platform based on Competitive Protein Adsorption for Thyroglobulin Detection," *Design of Medical Devices Conference*, April 13-15<sup>th</sup>, 2009, Minneapolis
23. **S. Choi**, & J. Chae, "A Novel Reusable Vroman Effect-based Biosensor," *IEEE, Emerging Device and Packaging Technologies*, November 14<sup>th</sup>, 2008, Arizona State University, USA
24. **S. Choi**, J. Heo, & I. Chung, "Fabrication of Top gated Single-Walled Carbon Nanotube Field Effect Transistor Utilizing Scanning Probe Lithography," *AVS 50<sup>th</sup> International Symposium and Exhibition*, November 2-7<sup>th</sup>, 2003, Baltimore, USA.
25. **S. Choi**, J. Heo, D. Kim & I. Chung, "Properties of nano-size PZT grains determined by surface potential utilizing Kelvin Force Microscope," *7<sup>th</sup> International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures*, November 17-19<sup>th</sup>, 2003, Kyoto, Japan.

#### Others

#### Previous – 2012 (Non SUNY Binghamton)

##### **Book :**

1. **S. Choi**, "Advancing Microfluidic-Based Protein Biosensor Technology for Use in Clinical Diagnostics," *LAP LAMBERT Academic Publishing GmbH & Co. KG*, (ISBN 978-3-8465-5504-0), 2012

##### **Book Chapters:**

1. **S. Choi**, & J. Chae, "A surface plasmon resonance biosensor based on competitive protein adsorption for the prognosis of thyroid cancer" in "Biosensors and Molecular Technologies for Cancer Diagnostics" Avi Rasooly (Program Director, Cancer Diagnosis Program, National Cancer Institute) and Keith E. Herold, *CRC Press (Taylor & Francis Group)*
2. **S. Choi**, & J. Chae, "Microfluidic biosensors for thyroglobulin detection and application to thyroid cancer" in "Biosensors and Cancer" Professor Victor R Preedy (PhD DSc FRSPH FIBiol FRCPath, King's College London), *SCIENCE PUBLISHERS*

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**Patent:**

1. J. Chae & S. Choi, "REUSABLE BIOSENSOR PLATFORM," - WO 2010088219
2. J. Chae, B.E. Rittmann, S. Choi, H. Lee, "Micro-sized Microbial fuel cell," US 13153110

**■ INVITED TALKS**

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1. Invited to give a lecture at the Medical Engineering Department, **University of South Florida** on September 30<sup>th</sup>, 2024.
2. Invited to give a talk at **The Minerals, Metals & Materials Society (TMS) 2024** (March 3-7, 2024) in Orlando, Florida, USA (Session: Printed Electronics and Additive Manufacturing) (Title: Advanced Materials and Manufacturing Processes for Transient Papertronics).
3. Invited to give a talk at **IEEE International Conference on Flexible, Printable Sensors and Systems (FLEPS) 2023** (July 9-12, 2023) in Boston, Massachusetts, USA (Focused Session 7: Fiber-based Soft Sensors and Devices) (Title: Paper-Based Wearable Biosensors and Biobatteries)
4. Invited to give a talk at **2023 MRS Spring** (April 10-14, 2023) in San Francisco, California, USA (SB04—Flexible Bioelectronics for In Situ Analysis) (Title: Paper-based Devices for Flexible and Wearable Applications).
5. Invited to give a tutorial talk on the topic "Biofuel cells" at the **PowerMEMS 2022 School** (Dec. 12, 2022, Salt Lake City, Utah, USA)
6. Invited to give a talk at Materials & Devices Advanced Research Center, **LG Electronics Inc.** (Online, Sep. 1, 2022) (Title: Papertronics).
7. Invited to give a talk at **2022 MRS Spring** (May 8-13, 2022) in Honolulu, Hawaii, USA (SF03—Paper-Based Packaging—21st Century Perspectives on an Ancient Material).
8. Invited to give a **Distinguished Mercer Lecture** at the Department of Electrical, Computer, or Systems Engineering at **Rensselaer Polytechnic Institute** (Dec. 8<sup>th</sup>, 2021) (Title: Bacteria-powered batteries)
9. Invited to give an online talk for **Build-a-Cell seminar series** (<https://www.buildacell.org/seminar>) (Nov. 22, 2021; Title: Electrogenic bacteria for Powering, Sensing, and Synthesizing)
10. Invited to give a talk at the Watson Advisory Board Meeting (Nov. 19<sup>th</sup>, 2021) – Internet of Disposable Things
11. Invited to give a **Keynote talk** at the **Korean Society for Biotechnology and Bioengineering – Recent Applications of Bioelectrochemical Technology for Sustainable Energy and Environment Session**, October 6-9, 2021. (Title: Bacteria-powered batteries)
12. Invited to give an online talk at **32nd Annual Electronics Packaging Symposium - Small Systems Integration** (Virtual meeting, Sep. 8-9, 2021) (Title: Papertronics for Internet of Disposable Things)
13. Invited to give a **Keynote talk** at the **30<sup>th</sup> Northeast Regional Conference of Korean-American Scientists and Engineering Association**, April 3<sup>rd</sup>, 2021. (Title: Bacteria-powered batteries)
14. Invited to give an online talk at **Temple University** (ECE Dept.), Dec. 2<sup>nd</sup>, 2020. (Title: Microorganisms to Generate Electricity)
15. Invited to give an online talk at **University of Massachusetts Amherst** (ECE Dept.), Nov. 11<sup>th</sup>, 2020. (Title: Microorganisms to Generate Electricity)
16. Invited to give a talk at **North Carolina State University** (NSF ASSIST Center), Mar. 6<sup>th</sup>, 2020. (Title: Microscale Engineering to Electromicrobiology)
17. Invited to give a talk at **2020 TMS Annual Meeting** (Feb. 23-27) in San Diego, USA (Functional Nanomaterials 2020: Translating Innovative into Pioneering Technologies) (Title: Biogenic Nanoparticles on Exoelectrogens)
18. Invited to give a **Keynote talk** on Biobatteries at **12th International Conference & Exhibition on Biosensors and Bioelectronics** (Oct. 25~26, 2019 at Vancouver, Canada) (Title: Powering Biosensors with Disposable Biobatteries)
19. Invited to give a talk at **31th Annual Electronics Packaging Symposium - Small Systems Integration** (Sep. 5-6, 2019 in Niskayuna, NY, USA) (Title: Powering Papertronics and Fibertronics with Biobatteries)
20. Invited to **Science Foo Camp 2019** (July 12-14 in Mountain View, CA; Organized by Google, O'Reilly Media, and Digital Science) – Only 350 people are invited from around the world who are doing groundbreaking work in diverse areas of science and technology.
21. Invited to give a talk at **2019 MRS Spring** (Apr. 22-26) in Arizona (Symposium EP05 - Engineering Functional Multicellular Circuits, Devices and Systems). (Title: Microorganisms to Generate Electricity)
22. Invited to give a talk at **Johns Hopkins University** (Extreme Materials Institute), Mar. 15<sup>th</sup>, 2019. (Title: Microscale Engineering to Electromicrobiology)
23. Invited to give a talk at **Stevens Institute of Technology** (ECE Department), Mar. 11<sup>th</sup>, 2019. (Title: Microscale Engineering to Electromicrobiology)
24. Invited to give a talk at **Tufts University** (ECE Department), Feb. 15<sup>th</sup>, 2019. (Title: Microscale Engineering to Electromicrobiology)

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25. Invited to give a talk at **Princeton University** (Plasma Physics Laboratory), Jan. 16<sup>th</sup>, 2019. (Title: Microscale Engineering to Electromicrobiology)
  26. Invited to give a talk at the **University of Rochester** (Department of Anesthesiology Grand Rounds), Dec. 20<sup>th</sup>, 2018. (Title: Micro- & Nano-medical Technologies and Applications)
  27. Invited to give a talk at **IEEE NANOMED 2018**, Dec. 2-5, Hawaii, USA (Title: Powering point-of-care diagnostic devices with Disposable Biobatteries)
  28. Invited to give a talk at **ACS Boston Symposium 2018**, Aug. 19-23, Boston, USA (Title: Merging Electronic Bacteria with Paper)
  29. Invited to give a talk at **2018 MRS Spring**, Apr. 2-6, Phoenix, USA (Title: On-Demand Power Generation from Lyophilized Exoelectrogens)
  30. Invited as a guest speaker for an interesting research seminar at the **University of New Hampshire** (Dept. of ECE), Nov. 17<sup>th</sup>, 2017.
  31. Invited as a speaker for the Second Annual Summit on Science Enablement for the Sustainable Development Goals (sponsored by the **New York Academy of Sciences**), October 17<sup>th</sup>, 2017, New York, USA.
  32. Invited as a speaker for the **18th US-KOREA Conference** on Science, Technology and Entrepreneurship (UKC), August 9-12, 2017, Washington DC, USA
  33. Invited as a panelist for the **NSF Workshop on Papertronics: Paper-based Electronics for the 21<sup>st</sup> Century**, Sep. 12-14, 2016, Arlington, VA, USA
  34. Invited as a panelist for **SUNY 4E Workshop on Energy & Sustainability**, Nov. 20-21, Binghamton, NY, USA, 2014
  35. Invited as a speaker for **the Center for Advanced Sensors and Environmental Systems (CASE)** workshop, Mar. 22, 2013, Binghamton University, Binghamton, USA.
  36. Invited as a speaker for **the IEEC TAB meeting**, Oct. 2, 2012, Binghamton University, Binghamton, USA.

## ■ GROUP HIGHLIGHTS (Media outlets)

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*Dr. Choi's research achievements have gained substantial public recognition through coverage in various media and news outlets. This exposure has not only heightened public interest in his work but also provided him with valuable opportunities to share his research contributions with the wider community and society.*

1. Our all-paper-based-electronic circuit has been featured in many media outlets including WBNG news, Electronics For You, Tech Xplore, Knowridge, Phys.org, etc. *March 2024.*
2. Our new NSF grant on papertronics has been highlighted in media outlets. *August 2023.*
3. Our tiny biobattery with 100-year shelf life has been featured in many media outlets including Phys.org, News Break, Science Times, Newswise, etc. *April, 2023.*
4. Our ingestible biobattery has been featured in many media outlets including WBNG, ScienceDaily, Interesting Engineering, Newswise, Flipboard, etc. *December, 2022*
5. Many news agencies highlighted our new papertronic technique, published in ACS Applied Materials & Interfaces. This work was featured by ACS, ASME, EurekAlert, Printed Electronics World, AZoM, New Atlas, etc. *October, 2022*
6. Our paper-based biobattery has been featured in *Science & Vie*, France's leading scientific magazine.
7. Many news agencies highlighted our work on "plug-n-play biobattery," published in Journal of Power Sources. The media outlets include ScienceDaily, Technology Networks, Interesting Engineering, Tech Xplore, Inceptive Mind, ASME, STLE, and many others. *June and August, 2022*
8. Accomplishments of Choi's student, Mya Landers, have been featured in BU News. *June, 2022*
9. Choi's view on biobatteries has been highlighted in Battery Power (batterypoweronline.com)
10. Many news agencies highlighted our new research awards from the National Science Foundation and the Office of Naval Research. The media outlets include sciencefolksa, SUNY RF, miragenews, and many others. *April, 2021.*
11. Many news agencies highlighted our new method for antibiotic susceptibility testing, published in Biosensors and Bioelectronics. The media outlets include Phy.org, Eurekalert, Technologynetworks, Health Europa, ScienceDaily, Diagnostic World, and many others. *December, 2020*
12. Many news agencies highlighted our new research award from National Science Foundation for stretchable papertronic project. The media outlets include NEWSWISE, News Break, Sciencenewsnet, and many others. *June, 2020*
13. Our work on co-cultured biosolar cells has been highlighted in many media outlets including News Break, AE-Daily, Pioneering Minds, Defense TechConnet, SUNY RF and many others, *May, 2020.*

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14. Many news agencies highlighted our work on solid-phase biobatteries for IoT. The media outlets include Materials today, Sciencedaily, Techxplore, NEWSWISE, and many others. *June. 2019*
  15. Many news agencies highlighted our new research award from National Science Foundation for energy generation from human sweat. The media outlets include NEWSWISE, EurekAlert, SCIENMAG, The Engineer, and many others. *May, 2019.*
  16. The work on “Paper biobatteries” has been highlighted in THE CONVERSATION. *Sep., 2018.*
  17. Choi’s presentation at the ACS conference was highlighted in many news agencies including Chemical & Engineering News, ScienceDaily, IEEE Spectrum, etc. *Aug. 2018.*
  18. Many news agencies highlighted our new research award from the Office of Naval Research for the micro-biophotovoltaics project. The media outlets include EurekAlert, Phys.ORG, Scienmag, NEWSWISE, and many others. *May, 2018*
  19. Many news agencies highlighted our work on textile biobatteries. The media outlets include Materials today, Sciencedaily, Techxplore, NEWSWISE, and many others. *Jan.. 2018*
  20. Many news agencies highlighted our work on the glucose sensor. The media outlets include Phys.ORG, Sciencedaily, Wearable, Biospace, and many others. *Sep. 2017*
  21. Our saliva-based biobattery has been selected as one of 7 diagnostic devices to boost healthcare in the developing world (Medical Design & Outsourcing). *Aug. 2017.*
  22. BU magazine featured our research group. *Aug. 2017.*
  23. Many news agencies highlighted our work on saliva-based biobatteries published in Advanced Materials Technologies. The media outlets include Sciencedaily, Popular Mechanics, IFLScience, Electronics360, Foxnews, and many others. *Aug. 2017.*
  24. Our high school student who worked in our lab during 2016 Summer won high awards in many research competition including Intel International Science & Engineering Fair (1st), Long Island Science & Engineering Fair (1st), New York State Science & Engineering Fair (2nd), Long Island Science Congress (Highest Honors), and WAC Lighting Foundation Invitational Science Fair (2nd).
  25. New York State's Empire State Development highlighted our research group (<https://esd.ny.gov/esd-media-center/esd-blog/higher-ed-fuels-energy-innovation>). *Jun. 2017.*
  26. A SUNY BU video clip featured our group’s work (biobatteries), *Mar. 2017* - <http://ws.binghamton.edu/choi/BU.html>
  27. Many news agencies highlighted our work on biological solar cells published in Journal of Power Sources. The media outlets include Phys.org, Sciencedaily, ScienceNewsline, Electronicproducts, Healthmedicinet, and many others. *Mar. 2017.*
  28. Our work was selected as a finalist paper for one of the best paper contests at the IEEE MEMS 2017.
  29. Many news agencies highlighted our work on bacteria-powered battery on single sheet of paper published in Advanced Materials Technologies and IEEE MEMS 2017 Conference proceeding. The media outlets include Sciencedaily, Sciencenewsline, Newswise, Esciencenews, Eurekalert, Smithsonian, NSF news and many others. *Dec. 2016.*
  30. We won best poster award at the “Science-to-Technology Day” 2016 Workshop (CREATES). *Nov. 2016.*
  31. Our origami ninja star battery gained significant attention from the community and was reported on in media outlets, including NSF Science360 News, Discover-e, ScienceDaily, SpaceDaily, Science Newsline, Innovation Toronto, Materialsgate, Arts Insiders, and e-Science News. *Jun. 2016.*
  32. Our Bio-solar panel was selected as the top 10 technologies shaping the future of solar power in Livemint News. *Jun. 2016.*
  33. Our Bio-solar panel gained significant attention from the community and was reported on in media outlets, including ScienceDaily, ECN Magazine, NDTV.com, ZME Science, Siliconrepublic, CIOL, AZO Cleantech, The Stack, Crazy Engineers, The Engineer, Business Standard, Silicon India, Energy Matters, News Nation, Before it's New, New Energy and Fuel, Nature World News, Solar Energy News, and e! Science News. *Apr. 2016.*
  34. Our high school student who worked in our lab during 2014 & 2015 Summer won the first place in the medicine and health category at WESEF 2016. *Mar. 2016.*
  35. Our news articles were selected as the top story and the number two story for 2015 on Binghamton Research Discover-e. *Jan. 2016.*
  36. Our origami paper-based battery was selected as the top technology of "The Most Impressive Technologies of 2015" in Qmed Medical Product Manufacturing News. *Jul. 2015.*
  37. Our origami paper-based biofuel cell work was reported by Time Warner Cable News, Newsweek Europe, Electronics Weekly (UK), Dutch Magazine KIJK, BBC Focus Magazine, TreeHugger, ScienceDaily, IEEE Spectrum, Lab Maganer Magazine, Health News Digest, Digital Trend, and Discover-e Newsletter at Binghamton University. *Jul. 2015.*

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38. Our micro-sized bio-solar cell was reported by Materials 360 (MRS's online publication), Solar Novus Today, Pipe Dream News and Discover-e Newsletter at Binghamton University. *Feb. 2015.*
  39. Our micro-sized bio-solar cell was featured on the cover of Lab Chip Journal. *Oct. 2014.*
  40. "Ask a Scientist" Column posted on our article, "How does bio-fuel work?" *Mar. 2013.*

## ■ ADVISING AND MENTORING

*Dr. Choi's commitment to fostering growth in his students extends beyond the classroom. He views mentoring as an integral aspect of his role, dedicating considerable time to guiding both graduate and undergraduate research programs. His approach is to offer specific research directions while encouraging students to lead their own projects, from ideation to realization. This empowerment not only boosts their motivation but also enriches their learning experience. His mentorship has borne fruit, with all his graduate students achieving success in academic and industrial spheres. Beyond these, over 50 undergraduate and many high school students have honed their skills in his lab, making significant research contributions and earning prestigious accolades from both the college and the department.*

### 1. Ph.D. students (Current)

1. [Anwar Elhadad](#) (Fall 2020~Present): Biosolar cells (Supported by ONR)
2. [Zahra Rafiee](#) (Spring 2021~Present): Antibiotic Susceptibility Testing (Supported by NSF)
3. [Lexi Gao](#) (Fall 2021~Present): Wearable Biofuel Cells (Supported by NSF)
4. [Maryam Rezaie](#) (Fall 2021~Present): Ingestible Biofuel Cells (Supported by NSF)

### **-Ph.D. Alumni**

1. [Jihyun Ryu](#) (Jan. 2019~Dec. 2021)  
Dissertation: Wearable Microbial Fuel Cells
2. [Lin Liu](#) (Sep. 2016~May 2021) – **Tenure-Track Assistant Professor at Seattle Pacific University**  
Dissertation: Performance Enhancement of Miniature Microbial Solar Cells
3. [Mehdi Tahernia](#) (Sep. 2016~Aug. 2020) – **Engineer at Applied Materials.**  
Dissertation: Papertronic Sensing Arrays for Rapid and High-throughput Screening of Electroactive Microorganisms
4. [Maedeh Mohammadifar](#) (Sep. 2015~May 2020) – **Tenure-Track Assistant Professor at the University of Texas at Permian Basin** (2020 ~ 2021), **Senior R&D Engineer at nVent** (2021 ~ 2022), and now **Staff Engineer at Bio-Rad Laboratories**  
Dissertation: Biobatteries for Health and Environmental Monitoring
5. [Yang Gao](#) (Sep. 2015~ May 2020) – **Postdoc at the University of Texas at Austin**  
Dissertation: Flexible and Stretchable Bacteria-Powered Biobatteries
6. [Arwa Fraiwan](#) (Sep. 2012~May 2016) – **Senior Research Associate at Case Western Reserve University**  
Dissertation: A Paper-based Biofuel Cell for On-Chip Biosensors

### 2. M.S. students (Current)

1. [Nicolette Cascioli](#) (Fall 2023~Present): Biofuel cells

### **-M.S. Alumni (Thesis)**

1. [Mya Landers](#) (2021~2022, ECE): Electronics Hardware Designer at Draper  
Thesis: Paper-Integrated Components for Disposable Papertronic Devices
2. [Jonghyun Cho](#) (2019~2020, BME): Ph.D. student at Rutgers University  
Thesis: A Paper-based Microbial Fuel Cell Sensor for Water Quality Monitoring
3. [Sumiao Pang](#) (2016~2017, BME); Ph.D. student at the University of Maryland  
Thesis: Flexible and Stretchable Microbial Fuel Cells
4. [Weiyang Yang](#) (2015~2016, ECE); Engineer at Luminus Devices (Ph.D. from Michigan State Univ.).  
Thesis: A microbial fuel cell-based biosensor for water quality monitoring
5. [Xuejian Wei](#) (2015~2016, ECE); Engineer at Intelligent Automation  
Thesis:  $\mu$ L-scale biological solar cells
6. [Gihoon Choi](#) (2013~2015, ECE); Engineer at Sandia National Lab (Ph.D. from Penn State Univ.).  
Thesis: A paper-based sensor array for electromicrobiology

### **-M.S. Alumni (Project)**

1. [Jason Tang](#) (2022~2023, ECE) – Project: Paper-based biofuel cells
2. [Stefan Richter](#) (2021~2022, ECE) – Project: Biosensors for Monitoring Ankylosing Spondylitis



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3. [Marwa Chowdhury](#) (2020~2021, ECE, Program manager at Central Hudson) - Project: Smart Bandage for Wound Healing
  4. [Amit Madan](#) (2020~2021, ECE, Engineer at Analog Devices) - Project: Moisture-induced Energy Harvesting
  5. [Emily Kimiecik](#) (2020~2021, ECE, Engineer at BAE Systems) - Project: Energy Harvesting
  6. [Shuai Feng](#) (2019~2020, ECE) – Project: Microbial Fuel Cells
  7. [Vishrut Vaman Shenoy](#) (2019~2020, ECE, Ph.D. at BU) – Project: Antibiotic Susceptibility Test
  8. [Andrew T Barza](#) (2019~2020, ECE) – Project: Biosensors for monitoring micro-plastics
  9. [Mohammed F Alyas](#) (2018~2019, ECE) - Project: Drug delivery
  10. [Jason Ephraim](#) (2018~2019, ECE, Engineer at Harris Corp.) - Project: Nanogenerator
  11. [Madhura R. Shanbhag](#) (2016~2017, BME) - Project: 3-D culture systems for C. elegans
  12. [Mark Freithaler](#) (2016~2017, ECE, Engineer at MACOM) – Project: Sweat-based microbial fuel cells
  13. [Kamil Roszkowski](#) (2015~2016, ECE, Engineer at General Dynamics) – Project: Biofuel production in Microfluidics
  14. [Jiem Nguyen](#) (2014~2015, ECE, Engineer at National Grid) – Project: UV LED-based photolithography systems
  15. [Shannon Rosario](#) (2013~2014, ECE) – Project: A Lab-on-a-chip for circulating tumor cells

### **3. B.S. students (Current)**

1. [Ron Alweiss](#) (Fall 2022~Present): Microbial Fuel Cells
2. [Baptiste Lavielle](#) (Fall 2024~Present): Papertronics

### **-B.S. Alumni (Selected)**

1. [Tharun Reddy Kandukuri](#) (2020, ECE) – PH.D. student at University of Oxford
  2. [Jinho Yoo](#) (2019, BME) – B.S. student at USC
  3. [Hail Chun](#) (2019, ME) – Engineer at Protec, INC (Korea)
  4. [Timothy S Kim](#) (2017, ECE) - Engineer at National Security Agency
  5. [Christopher Coogan](#) (2016, BE) - PH.D. student at University of Minnesota
  6. [Weiyi Li](#) (2016, ECE) - M.S. student at ETH Zurich
  7. [Jiaqi Zhang](#) (2015, ECE) - M.S. student at National University of Singapore
  8. [Bonnie Tran](#) (2014, ECE) - M.S. student at Columbia University
  9. [WanChao Guo](#) (2014, ECE) - Engineer at GE Aviation
  10. [San Yoon](#) (2014, Bio) - Medical Student at St. George's University
  11. [Hankeun Lee](#) (2014, ECE) – PH.D. student at UIUC
  12. [Simeng Chen](#) (2014, ECE) – Engineer at Apple (PH.D. from University of Colorado Boulder)
  13. [Chunhui Dai](#) (2014, ECE) – Postdoc at UC Berkeley (PH.D. from University of Minnesota)
  14. [Thu Nguyen](#) (2014, ECE) – Postdoc at University of Saskatchewan (PH.D. from University of Waterloo)
  15. [Steven J. Sundermier](#) (2013, ECE) - Engineer at BAE systems
- Advised more than 50 undergraduate students (since 2012)
  - More than 50% of them currently in pursuit of M.S. or Ph.D
  - About 25% of them - research fellowship/scholarship awardees
  - Co-authored more than 27 publications

### **4. NSF REU Program**

1. [Alexa Juran](#) (2017 Summer) from Broome Community College
2. [Landen Kwan](#) (2015 Summer) from Queensborough Community College
3. [Taneesha Beebe](#) (2014 Summer) from Russel Sage College

### **5. Other Undergraduate Programs**

1. [Archita Kothari](#) (2019 Summer): NIRMA University in India through Summer 2019 Internship at BU
2. [Bryanna Brown](#) (2017 Summer): Louis Stokes Alliance for Minority Participation (LSAMP) - M.S. student at Carnegie Mellon University
3. [Junle Lu](#) (2014 Summer): LAAMP/McNair Summer Research Program

### **6. High School Students**

1. [Dalton Peng](#) (2017 Summer) from Mount Hebron High School
2. [Kendra Zhang](#) (2016 & 2017 Summer) from Jericho High School – won high awards in many research competitions including Intel International Science & Engineering Fair (1st), Long Island Science & Engineering

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- Fair (1st), New York State Science & Engineering Fair (2nd), Long Island Science Congress (Highest Honors), and WAC Lighting Foundation Invitational Science Fair (2nd). (Currently student at Columbia University)
  3. Chris Fischer (2014 Summer & 2015 Summer) from Briarcliff High School – won Arizona State University Sustainability Solutions Initiative Award (Currently student at the University of Pennsylvania)
  4. Reed Walter (2011 Summer) from Loveland High School Biotechnology Program - ranked second in his class for the capstone competition (Currently student at Ohio State University)

➤ **Awards/Fellowships/Scholarships of Students Supervised**

1. Yang “Lexi” Gao – A finalist for the Best Poster Award Competition at the 2024 IEEE MEMS Conference
2. Maryam Rezaie – IEEE MEMS 2024 Travel Award
3. Zahar Rafiee – 2024 BU Graduate Student Excellent Award in Research
4. Yang “Lexi” Gao – 2023 University Clark Travel Award
5. Zahar Rafiee – 2023 University Clark Travel Award
6. Maryam Rezaie – 2023 Graduate School Travel Grant
7. Anwar Elhadad – 2023 Graduate School Travel Grant
8. Anwar Elhadad – 2023 Climate Corps. Summer Fellowship (Environmental Defense Fund)
9. Anwar Elhadad – 2023 BU Graduate Student Excellent Award in Research
10. Anwar Elhadad – 2022 Graduate School Travel Grant
11. Anwar Elhadad – 2022 Fall Watson Professional Development Fund
12. Mya Landers – 2022 Department Research Award
13. Mya Landers – 2022 Watson Katie Root Award
14. Anwar Elhadad – 2022 Spring Watson Professional Development Fund
15. Anwar Elhadad – 2022 Transducer Research Foundation Travel Award
16. Zahar Rafiee – 2022 Spring Watson Professional Development Fund
17. Zahar Rafiee – 2022 Transducer Research Foundation Travel Award
18. Maryam Rezaie – 2022 Spring Watson Professional Development Fund
19. Maryam Rezaie – 2022 Transducer Research Foundation Travel Award
20. Maryam Rezaie – The Best Paper Award Winner at the 2022 Hilton Head Microsystems Workshop
21. Yang “Lexi” Gao – 2022 Spring Watson Professional Development Fund
22. Yang “Lexi” Gao – 2022 Transducer Research Foundation Travel Award
23. Yang Gao – 2020 BU Graduate Student Excellent Award in Research
24. Maedeh Mohammadifar – 2019 Fall Graduate School Travel Grant
25. Yang Gao – 2019 Fall Graduate School Travel Grant
26. Maedeh Mohammadifar – 2019 BU Graduate Student Excellent Award in Research
27. Maedeh Mohammadifar – 2018 Department PHD Research Award
28. Do Hoon Yong – 2016 S3IP Undergraduate Research Initiative
29. Weiyang Yang – 2016 Department MS Research Award
30. Christopher G Coogan – 2015 Summer Scholars and Artists Scholarship
31. Gihoon Choi – 2015 Department MS Research Award
32. Arwa Fraiwan – 2015 Department PHD Research Award
33. Christopher G Coogan – 2015 Undergraduate Research Award
34. Kamil Roszkowski – 2015 Undergraduate Research Award
35. Jun Myung Song – 2015 Undergraduate Research Award
36. Erin E Small – 2015 Undergraduate Research Award
37. Jiang Wu – 2015 Undergraduate Research Award
38. Timothy S Kim – 2015 Undergraduate Research Award
39. Weiye Li – 2015 Undergraduate Research Award
40. Jiaqi Zhang – 2014 Undergraduate Research Award
41. Jiaqi Zhang – 2014 S3IP Undergraduate Research Initiative
42. Dianra Hassan – 2014 Summer Scholars and Artists Scholarship
43. Chunhui Dai – 2014 Department BS Research Award
44. Chunhui Dai – 2013 Undergraduate Research Award
45. Chunhui Dai – 2013 Summer Scholars and Artists Scholarship
46. Hankeun Lee – 2013 S3IP Undergraduate Research Initiative
47. Arwa Fraiwan – 2013 Travel Support by the GSEU Professional Development Award

➤ **Other MS & PHD Committees**

1. Yikang Jing (MSE) – 2024 PH.D. Committee (Outside examiner)

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2. Pengcheng Yin (ME) – 2024 PH.D. Committee (Outside examiner)
  3. Yunxiang Zhang (ECE, 2023~Present) – PH.D. Committee
  4. Joab Dorsainvil (BME, 2023~Present) – PH.D. Committee
  5. Isik Su Buyuker (MSE) – 2023 PH.D. Committee (Outside examiner)
  6. Jayanth Sivakumar (SSIE) – 2022 PH.D. Committee (Outside examiner)
  7. Jong Hwan Ha (ME, 2022~Present) – PH.D. Committee
  8. Nabid Hossain (ME) – 2022 PH.D. Committee (Outside examiner)
  9. Yu Tian (ME, 2022~Present) – PH.D. Committee
  10. Sajad Karimi (SSIE) – 2021 PH.D. Committee (Outside examiner)
  11. Sara Abedi (SSIE) – 2021 PH.D. Committee (Outside examiner)
  12. Awnalisa B Walker (SSIE) – 2021 PH.D. Committee (Outside examiner)
  13. Junbo Yang (ME, 2020~Present) – PH.D. Committee
  14. Chongyang Cai (ME, 2020~2022) – PH.D. Committee
  15. Meysam Daeichin (ME) – 2020 PH.D. Committee (Outside examiner)
  16. Ellie Plotkin-Kaye (BS) – 2020 Undergraduate Honors Thesis Committee
  17. Ryan Cadwell (ECE) – 2020 M.S. Committee
  18. Mark Pallay (ME) – 2020 PH.D. Committee (Outside examiner)
  19. Duaa M Serhan (SSIE) – 2019 PH.D. Committee (Outside examiner)
  20. Wuxiang Feng (ME, 2019~Present) – PH.D. Committee
  21. Ji Hyun Yang (BME, 2019~Present) – PH.D. Committee
  22. Huayan Wang (ME) – 2019 PH.D. Committee (Outside examiner)
  23. Matthew S. Brown (BME, 2018 ~ 2022) – PH.D. Committee
  24. Ganesh Sainadh Gudavalli (ECE, 2018 ~ 2019) – PH.D. Committee
  25. Farshad Azadian (ECE, 2017 ~ 2021) PH.D. Committee
  26. Faruk Ballipinar (ECE, 2015 ~ 2018) PH.D. Committee
  27. Navjot Kaur Sidhu (ECE, 2014~2016) PH.D. Committee
  28. Mikhail A Coloma (ECE, 2014~2017) PH.D. Committee
  29. Robert Congdon (CHEM) – 2014 PH.D. Committee (Outside examiner)
  30. Benjamin Heo (BME) – 2019 M.S. Committee
  31. Youjoong Park (BME) – 2018 M.S. Committee
  32. Avinav Verma (ECE) – 2015 M.S. Committee
  33. Sandeep Singh (ECE) – 2015 M.S. Committee
  34. William Marin (ECE) – 2014 M.S. Committee