Aman Bhatia

Postdoctoral Research Associate-III, University of Arizona

Contact Information

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Professional Summary

- Initiative-taking in gaining experience in a research academic career in the field of electrochemistry, nanomaterials, biosensing devices, and bioassay development.
- Experienced in conceiving, designing experiments (DOE), and leading multidisciplinary projects in wearable biosensors with proven record of publications and mentoring scientists.
- Expand research ideas and focus on creating devices that intimately integrate with biological systems.

Research Interests

- Biosensors: POC-based Electrochemical immunosensors, Wearable devices, Microfluidics
- Electrochemistry, Analytical chemistry, Instrumentation chemistry
- 3D printing (FDM and SLA), Polymer extrusion process, PCB Fabrication, and Haptic technology (basics)
- Nanocomposites, Nanomaterial synthesis, Material characterization
- Biocatalytic enzymatic precipitation, Protein-protein/Nanoparticle-protein bioconjugation chemistry

Professional Appointments

Postdoctoral Research Associate-III | 2023-Present | University of Arizona | Arizona, USA | Biomedical Engineering

- Wrote an extensive review on wireless battery-free and fully implantable organ interfaces.
- Co-wrote and -authored papers focusing on biosymbiotic devices and long-term chronic monitoring (for chronic long-range monitoring of biosignals and Haptic feedback).
- Developed MOx-based soft composites for integration in wearable biosymbiotic platform and microfluidics.
- Electronic device and PCB design, prototyping and assembly for wearable electronics.
- Cleanroom tasks, including biocompatibility coating and electron beam physical vapor deposition.
- Wrote an extensive review on the current state of the art of wearable technologies for innovations in biointerfaces, power strategies, biosensing modalities, and data analysis.

Postdoctoral Researcher | 2022-2023 | Pusan National University | Busan, South Korea | Chemistry

- Developed a Fc compound with rapid dissolvability and high electron-mediation for glucose detection.
- Introduced an electrochemical (EC) immunosensor for PTH detection using EC-nanocatalytic redox cycling.

Research Assistant | 2017 (Five months) | Indian Oil Corporation Limited-Alternate Energy Dept. | Faridabad, India

- Synthesis of Zn and Cu-doped zeolitic imidazolate frameworks (ZIF-8) for hydrogen storage enhancement.
- Characterization and analysis of developed material (functional groups identification and specific SA).

Academic Education

Ph.D. | 2018-2022 | Pusan National University | Busan, South Korea | Chemistry

- Major Research Interest: Electrochemical biosensors, Nanoelectrochemistry, Enzymatic mechanisms
- Highlight: Development of unique signal amplification strategies and electro-sensing based on enzymatic inorganic and metal precipitation to quantify biomarkers such as PTH and Interleukins in clinical samples (saliva and serum).
- Thesis: Electrochemical immunosensors employing catalytic silver deposition and a polyenzyme label.

M.Sc. | 2015-2017 | Amity University | Uttar Pradesh, India | Applied Chemistry

- Major Research Interest: Ionization & Polymer Chemistry, Silane Coupling, UV/Vis Spectrometric Analysis

B.Sc. | 2011-2014 | Delhi University | Delhi, India | Industrial Chemistry

Publications

Biosymbiotic Wearable Devices/Organ Interfaces:

1. **Aman Bhatia**, Jessica Hanna, Tucker Stuart, Kevin Albert Kasper, David Marshall Clausen, Philipp Gutruf "Wireless battery-free and fully implantable organ interfaces", *ACS Chem. Reviews.*, **2024** 124 (5), 2205-2280. **(IF: 72.08)** *Link*

2. **Aman Bhatia**, Kevin Albert Kasper, Philipp Gutruf "Continuous biosignal acquisition beyond the limit of epidermal turnover", *Mater. Horiz.*, **2025**. **(IF: 10.70)** *Link*
3. Amanda Tyree, **Aman Bhatia**, Minsik Hong, Jessica Hanna, Kevin Albert Kasper, Brandon Good, Dania Perez, Dema Nua Govalla, Abigail Hunt, Vasanth Sathishkumaraselvam, Jordan Philip Hoffman, Jerzy W Rozenblit, Philipp Gutruf. "Biosymbiotic haptic feedback-sustained long term human machine interfaces", *Biosens. Bioelectron.*, **2024,** 261, 116432**. (IF: 10.70)** *Link*
4. Tucker Stuart, Max Farley, Julia Amato, Ryan Thien, Jessica Hanna, **Aman Bhatia**, David Marshall Clausen, Philipp Gutruf. "Biosymbiotic platform for chronic long-range monitoring of biosignals in limited resource settings", *PNAS,* **2023**, 120 (50), e2307952120. **(IF: 11.10)** *Link*
5. **Aman Bhatia** and Philipp Gutruf. "Advancing health monitoring with FDM-infused conductive filaments for biosymbiotic wearable sensors" (In-progress, expected Submission, Advanced Materials: 2025). **(IF: 26.80)**
6. Kevin Kasper, Ryan Thien, **Aman Bhatia,** and Philipp Gutruf. "Wearable AI For On-Device Frailty Assessment" (Contributed to human studies & defining IRB protocols, Nat. Comms: 2025). **(IF: 15.70)**

Electrochemical Biosensing/Signal Amplification Strategies:

7. **Aman Bhatia**, Ponnusamy Nandhakumar, Gyeongho Kim, Nam-Sihk Lee, Young Ho Yoon, Haesik Yang. "Simple and fast Ag deposition method using a redox enzyme label and quinone substrate for the sensitive electrochemical detection of thyroid-stimulating hormone", *Biosens. Bioelectron.,* **2022**, 197, 113773. **(IF: 10.70)** Link
8. **Aman Bhatia**, Hee Sam Na, Ponnusamy Nandhakumar, Byeongjun Yu, Sangyong Jon, Jin Chung, Haesik Yang. "Electrochemical detection of interleukin-8 in human saliva using a polyenzyme label based on diaphorase and neutravidin", *Sens. Actuators B: Chem.,* **2021**, 326, 128979. **(IF: 9.22)** *Link*
9. **Aman Bhatia**†, Woohyeong Lee†, Ponnusamy Nandhakumar†, Gyeongho Kim, Jung Min Joo, Haesik Yang. "Dicarboxylate-containing and fully substituted ferrocene with rapid dissolvability, high solubility, good stability, and moderate formal potential for mediated electrochemical detection", *J. Mater. Chem. B.,* **2023**, 11 (10), 2258-2265. **(IF: 7.57)** *Link*
10. **Aman Bhatia**, Ponnusamy Nandhakumar, Gyeongho Kim, Jihyeon Kim, Nam-Sihk Lee, Young Ho Yoon, Haesik Yang. "Ultrasensitive detection of parathyroid hormone through fast silver deposition induced by enzymatic nitroso reduction and redox cycling", *ACS Sens.,* **2020**, 4 (6), 1641-1647. **(IF: 8.20)** *Link*
11. Ponnusamy Nandhakumar, **Aman Bhatia**, Nam-Sihk Lee, Young Ho Yoon, Haesik Yang. "Rapid nanocatalytic reaction using antibody-conjugated gold nanoparticles for simple and sensitive detection of parathyroid hormone", *Int. J. Biol. Macromol.,* **2023**, 241, 124574. **(IF: 7.70)** *Link*
12. Ponnusamy Nandhakumar, Woohyeong Lee, Sangwook Nam, **Aman Bhatia**, Jia Seo, Gyeongho Kim, Nam-Sihk Lee, Young Ho Yoon, Jung Min Joo, Haesik Yang. "Di (thioether sulfonate)-substituted quinolinedione as a rapidly dissoluble and stable electron mediator and its application in sensitive biosensors", *Adv. Healthc. Mater.,* **2022**, 11 (2), 2101819. **(IF: 10)** *Link*
13. Kai Yan, Ponnusamy Nandhakumar, **Aman Bhatia**, Nam-Sihk Lee, Young Ho Yoon, Haesik Yang. "Electrochemical immunoassay based on choline oxidase-peroxidase enzymatic cascade", *Biosens. Bioelectron.,* **2021**, 171, 112727. **(IF: 10.70)** *Link*
14. Kai Yan, Al-Monsur Jiaul Haque, Ponnusamy Nandhakumar, **Aman Bhatia**, Nam-Sihk Lee, Young Ho Yoon, Haesik Yang. "Boosting electrochemical immunosensing performance by employing acetaminophen as a peroxidase substrate", *Biosens. Bioelectron.,* **2020**, 165, 112337. **(IF: 10.70)** *Link*
15. **Aman Bhatia**†, Seonhwa Park†, Ponnusamy Nandhakumar†, Jihyeon Kim, Haesik Yang. "Au nanoparticle-catalyzed electron transfer from ammonia-borane to $Ru(NH_3)_6^{3+}$ for sensitive biosensing", *Bull. Korean Chem. Soc.,* **2024**, 45, 366-372. **(IF: 1.24)** *Link*
16. Woohyeong Lee, Jung Min Joo, Ponnusamy Nandhakumar, Sangwook Nam, **Aman Bhatia**, Jia Seo, Gyeongho Kim, Haesik Yang. "Development of heteroarene-fused quinones as rapidly dissoluble and stable biosensors", *ECS Meeting Abstracts,* **2022**, 2238. *Link*
17. **Aman Bhatia.** "Biocatalytic precipitation-based methods for signal amplification in electrochemical biosensors: A Review" (Expected Submission: Biosens. Bioelectron. Jan, 2026). †Co-first author.

Awards and Grants

- Postdoctoral Travel Grant, Postdoctoral Affairs | University of Arizona | 2024
- National Science Foundation (NSF) Grant | Under Review | 2025
- PNU Postdoctoral Fellowship | Pusan National University | 2022
- Best Oral Presentation Award at 4th Chemistry Fair | Pusan National University | 2021
- Prestigious Brain Korea-21 (BK-21) Ph.D. Fellowship| 2019
- Travel Grant from Korea Research Foundation: *Conference on Bio-sensing Technology* | Kuala Lumpur | 2019
- Travel Grant from Japan Science & Technology, Sakura Exchange Program | 2017

Technical Skills

Hardware	Software	Other Skills
▪ Electrochemical Workstation	▪ Illustrator	▪ Technical IRB Writing
▪ LPKF ProtoLaser	▪ Fusion 360	▪ Multidisciplinary Collaboration
▪ Wearable Devices	▪ AutoCAD	▪ Project Management
▪ FDM/SLA 3D Printing	▪ MATLAB	▪ Design of Experiments
▪ Microsoldering	▪ Arduino IDE	▪ SOP Generation
▪ SEM-VEGA3 TESCAN	▪ PrusaSlicer	▪ Statistical Analysis
▪ Metrohm Dropsens ECL	▪ Chem Draw	▪ Written and Verbal Communication
▪ UV-visible Spectrometer	▪ Sigmaplot	▪ Problem Solving
▪ Gel Electrophoresis	▪ Origin	

Scholarly Activities

- Vivid Reviewer of "Biosen. Bioelectron." and "Mater. Sustain.", Elsevier Journals | 2022-Present
- Organized Arizona Postdoctoral Research Conference (APRC) | Abstract Review Committee | 2024

Mentorship

BME Students "Material Characterization and Medical Device Design" | University of Arizona | 2023 Fall & 2024 Spring

- Designed and implemented lesson plans to assist with student engagement using leaner-centered approaches.
- Developed SOPs: 3D Printers amd Polymer extruder (self-assembled in lab).

REAL Work (Research, Engineering Advocacy, and Leadership) Student | University of Arizona | 2024 Summer

- Assisted in device fabrication and soldering skills, material development using extrusion process to engineering undergraduates.

KEYS Research Internship | BIO5 Institute, University of Arizona | 2024 Summer

- Assisted in providing premier training to high school student interested in developing STEM skills.
- Guided student to perform stress-strain analysis of 3D printed nanocomposites to eventually present a poster.

BNL (Biosensors and Nano-electrochemistry Lab) Students | Pusan National University

- Assisted master's students to apply for Brain Korea Ph.D. Fellowship.
- Guided students to fabricate electrochemical enzymatic biosensors and perform clinical samples testing.

Conferences and Seminars

Oral Presentations:

- **Invited Talk:** Biosymbiotic haptic feedback-Human machine interfaces. **Pittcon | Boston, USA | 2025**
- **Invited Young Scientist Speaker:** Noninvasive electrochemical detection of a cytokine (IL-8) in human saliva using a Diaphorase based polyenzyme label. Third International Conference on Research for Environmental Sustainability & Planetary Health | University of Delhi | 2022
- **72nd Annual Meeting of the International Society of Electrochemistry:** Fast silver deposition induced by enzymatic reduction for ultrasensitive detection of parathyroid hormone | Jeju, Republic of Korea | 2021
- **ACS Fall 2021:** Polyenzyme label based on diaphorase and neutravidin for electrochemical detection of interleukin-8 in human saliva | Atlanta, GA, USA | 2021
- **4th Chemistry Fair:** diaphorase and neutravidin based polyenzyme label for noninvasive detection of interleukin-8 in human saliva | Busan, Republic of Korea | 2021

Poster Presentations:

- **Bio5 Postdoctoral Symposium:** Long-range monitoring of biosignals in limited resource settings using a biosymbiotic platform | University of Arizona, USA | 2022
- **Arizona Postdoctoral Research Conference (APRC):** Biosymbiotic Haptic Feedback-Sustained Long Term Human Machine Interfaces | Arizona, USA | 2024
- **Korean Chemical Society:** Simple and rapid Ag deposition method using a redox enzyme label and quinone substrate for the sensitive electrochemical detection of thyroid-stimulating hormone | Jeju, Republic of Korea | 2022
- **Korean Electrochemical Society:** Effects of Aging on Electrocatalytic Activities of Pt and Pd Nanoparticles Jeju, Republic of Korea | 2019
- **6th International conference on Biosensing Technology:** Washing-Free Cortisol Detection in Human Serum Using a Displacement Immunosensor | Kuala Lumpur, Malaysia | 2019
- **4th Chemistry Fair:** Diaphorase and neutravidin based polyenzyme label for noninvasive detection of interleukin-8 in human saliva | Busan, Republic of Korea | 2021

Certifications

Regulatory Adherence: Institutional Review Board (IRB) for Human Subjects | University of Arizona | 2024
General Laboratory Chemical Safety Training | University of Arizona | 2023

References

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