

# GURPARKASH SINGH

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Result-driven Biomedical Engineer with hands-on experience in sodium MRI, data analysis, and innovative problem solving. Proven track record of improving experimental accuracy and system performance.

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## EXPERIENCE

### Graduate Research Assistant | University of Alberta | Edmonton, AB, Canada

January 2024 – Present

- Obtained sodium MRI images using a home-built surface coil, proposing a novel sodium relaxometry method for compensating signal loss to accurately calculate tissue sodium concentration in skin.
- Conducted a comprehensively designed study on 20 healthy volunteers, acquiring skin sodium MRI at greater field strength of 4.7 T, and providing individual skin sodium relaxation properties.
- Achieved 4x higher in-vivo skin tissue sodium concentration in healthy volunteers compared to previous studies, and closely matching values obtained using chemical analysis in previous literature.
- Successfully identified bias from blood sodium signal in skin sodium levels, optimizing experimental protocol and improving result accuracy by 30%.
- Maintained 4.7 T MRI system, including routine helium refills and uptime monitoring.

### Electrical and Mechanical Assembler | Adara Systems | Burnaby, BC, Canada

January 2020 – December 2023

- Gained hands-on experience in assembling new devices by designing schematics, calibrating components, and ensuring their usability for research applications.
- Fabricated cone filters from raw materials using power tools, ensuring precision and compliance with industry standards, contributing to a 20% of total annual revenue.
- Organized training sessions for new employees on existing systems, resulting in a smoother onboarding process that increased work efficiency by 30% during first two months of employment.
- Created detailed documentation for production procedures, troubleshooting, and software tutorials, significantly reducing the time required for employees to assemble tools and equipment.
- Developed understanding of utilizing communication protocols like CAN, RS-232, and USB to facilitate efficient data exchange from drilling rigs.

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## EDUCATION

### Master of Applied Sciences in Biomedical Engineering | University of Alberta | Edmonton, AB, Canada

January 2024 - Present

- Distinguished member of university's Graduate Student Association, GPA: 4.0/4.0
- Specialization: Fundamentals of Magnetic Resonance Imaging and X-nuclei MR, Image Processing and Statistics

### Bachelor of Applied Sciences in BME, Minor in Mathematics | Simon Fraser University | Burnaby, BC, Canada

Degree obtained August 2023

- Obtained 3 Dean's Honour Roll and 1 President's Honour Roll, GPA: 3.47/4.33

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## TECHNICAL SKILLS

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|----------------------|------------------------------------|---------------------|
| • MATLAB             | • MRI Scanner Operation            | • Git               |
| • R, RStudio         | • Soldering                        | • Adobe Illustrator |
| • KiCad              | • Circuit Analysis and Debugging   |                     |
| • Visual Studio/Code | • Network Analyzers, Oscilloscopes |                     |
| • SolidWorks         | • Power Tools                      |                     |
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## **VOLUNTEERING**

- **BME Graduate Student Association Councilor | University of Alberta | Edmonton, AB, Canada**  
May 2024 – Present
- **Student Activities Director | Society of Punjabi Engineers and Technologists | Surrey, BC, Canada**  
February 2023 – January 2024
- **Food Hub Volunteer | Greater Vancouver Food Bank | Burnaby, BC, Canada**  
October 2019 – January 2020

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## **PROJECTS**

### **Subcutaneous Fat Measurement Using Ultrasound | Simon Fraser University | Burnaby, BC, Canada** January 2023 – April 2023

- Investigated the use of ultrasound imaging as a reliable alternative to traditional fat measurement techniques like skinfold calipers to minimize method discrepancies.
- Conducted fat thickness measurements on selected participants using ultrasound by scanning eight different anatomical locations, resulting in 20% reduction in error compared to other conventional methods.
- Designed a comprehensive system overview for a single transducer ultrasound sensor, including circuit schematics and operational flowcharts as a potential fat measurement device.

### **Direct Interface for Rapid Testing of Soil (DIRTS) | Simon Fraser University | Burnaby, BC, Canada** June 2022 – November 2022

- Developed hardware for a Bluetooth-enabled soil testing device that recommends suitable plant types based on soil's real time pH, moisture, and temperature levels.
  - Sourced and tested all individual sensors for performance and reliability, eventually designing a complete electrical and structural schematic for the prototype.
  - Engineered modifications to the enclosure to attach additional accessories like automated water pump for moisture control while ensuring the system remained dust- and rainproof in field conditions.
  - Authored prototype's technical documentation and served as lead presenter during demonstrations and evaluations.
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