

# JIA (SCARLETT) WEI

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## EDUCATION

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**Johns Hopkins University, Baltimore, MD**

**Biomedical Engineering, PhD**

PI: Dr. Ken Taguchi

Research Interests: PCD-CT, Physics Modeling, Image Quality.

*August 2023 - Present*

Expected in May 2028

**Union College, Schenectady, NY**

**Bachelor of Science in Biomedical Engineering**

**Seward Organizing Theme Minor (Computational Physics)**

Advisor: Professor Chandra Pappu and Professor Seyfollah Maleki

*September 2019 - June 2023*

Summa Cum Laude

## RESEARCH EXPERIENCE

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**Johns Hopkins University, School of Medicine**

*Graduate Research Assistant*

Baltimore, Maryland

*August 2023 - Present*

- Principal Investigator: Dr. Ken Taguchi
- Photon Counting CT algorithm development. Focuses on energy spectrum correction, imaging physics modeling, and 2D/3D image reconstruction.

**Washington University in St. Louis, School of Medicine**

*Purdy Summer Research Fellow*

St. Louis, Missouri

*June 2022 - August 2022*

- Mentor: Dr. Tong Zhu and Alex Price
- Developed quantitative evaluation matrices using the radiomics features for the performance of different MRI post-processing algorithms.
- Implemented the optimized workflow for post-processing and quantitative analyses of daily low-field MRI to a Python script.
- Shadowed treatment planning, on-site treatment, and machine QA for SBRT, Gamma knife, brachytherapy, and proton therapy.

**Rensselaer Polytechnic Institute**

*Undergraduate Research Volunteer*

Troy, New York

*September 2021 - January 2022*

- Principal Investigator: Professor Ge Wang
- Assisted Dr. Mengzhou Li in Biomedical Imaging Center, Rensselaer Polytechnic Institute, to construct 3D models of a novel scanner in Solidworks and AutoDesk.
- Conducted literature reviews on CT-MRI fusion machines.

**Mayo Clinic, Graduate School of Biomedical Sciences**

*Undergraduate Research Fellow*

Rochester, Minnesota

*June 2021 - August 2021*

- Mentor: Dr. Cynthia McCollough
- Completed Summer Foundations in Research course in Statistics and Clinical & Translational Sciences.
- Assisted Dr. Kishore Rajendran and Dr. Shuai Leng in CT Clinical Innovation Center, Mayo Clinic, to evaluate a new task-based automatic dose and keV selection tool on an investigational photon-counting CT using MATLAB.
- Conducted phantom scans and reconstructed CT images using syngo.via.

## Physics Department, Union College

*Student Researcher*

Schenectady, New York

*September 2020 - December 2021*

- Principal Investigator: Professor Colin Gleason
- Formulated and developed data filtering method for the  $\rho^-$  meson decay according to possibly particle reactions based on the various combination of final products.
- Extracted decaying data to perform calculations for spin-density matrix elements.

## CroCHET Lab, Union College

*Student Researcher / Technician*

Schenectady, New York

*October 2019 - October 2021*

- Principal Investigator: Professor John Rieffel
- Led the research of finding novel movements of silicone robots through quality diversity algorithms and simulations.
- Worked as a motion capturing technician. Assisted researchers with data collection, equipment management and preparation of samples.

## Chengdu Public Health and Medical Center

*Research Intern*

Chengdu, China

*June 2015 - July 2018*

- Mentor: Dr. Yong Zhao
- Cooperated with surgeons to provide psychological interventions for cancer patients. Assisted with distributing and gathering 50 in-person surveys based on SAS and SDS.
- Analyzed all the responses through SPSS 16.0 and gained statistically significant results.

## TEACHING EXPERIENCE

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### ECBE Help-Desk

*Tutor*

ECBE Department, Union College

*January 2022 - March 2023*

- Assisting students with course material, homework and exam preparations.
- Tutoring topics includes introductory and upper level electrical engineering courses, biomechanics, and bio-statics.

### CSC - 108 SCIENTIFIC COMPUTING

*Teaching Assistant*

Computer Sciences Department, Union College

*September 2020 - December 2020*

- Promoted student learning by providing individualized and small group support to reinforce classroom topics, and applications of python programs.
- Facilitated lab sessions, supervising tasks as program testing, coding, and script creation.

## PUBLICATIONS

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1. Manuscript in Progress: **Wei J**, Jones A, Raranje C, Hao Y, Kim T, Price A, Henke A, Kim H, Maraghechi B, Laugeman E, Gach E, Hanson J, Hugo G, Zhu T. *An Automated Image Processing Workflow for Quantitative Analysis of Daily Treatment MRI Acquired at ViewRay MRI-LINAC system.*
2. Zhao Y, Hua X, He Y, **Wei J**, Tan J, Chen X. *The Effect of Psychological Intervention on the Negative Emotion of Patients with HIV/AIDS Combined with Gastrointestinal Cancer.* Modern Journal of Integrated Traditional Chinese and Western Medicine. 2019; 30(29); 3406-3408.
3. Yang J, Chen T, Zhao Y, **Wei J**, He Y, Hua X, Feng S, Wang H. *Safety Evaluation of Surgery for AIDS Complicated with Colorectal cancer.* Chinese Journal of Bases and Clinics in General Surgery, 2018 June; 25(8); 934-940.

## PRESENTATIONS

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1. **Wei J**, Lee D, Stierstorfer K, Fung G, Polster C, Subramanian S, Taguchi K. *Log Conversion with Fewer Counts for Photon Counting CT: Decreasing Both Bias and Variance Simultaneously*. [Oral Presentation, SPIE Medical Imaging, San Diego 2025].
2. **Wei J**, Jones A, Raranje C, Hao Y, Kim T, Price A, Henke A, Kim H, Maraghechi B, Laugeman E, Gach E, Hanson J, Hugo G, Zhu T. *Optimizing Pre-Processing Workflow Towards Robust Longitudinal Radiomics Analysis of Abdominal Adaptive Planning MRI on Low Field-Strength MR-Linac Systems*. [Oral Presentation, AAPM Annual Meeting, Houston 2023].
3. Fein K \*, Musselman L\*, Watson Z \*, **Wei J\***, Cotter S, Loya A, Currey J. *Bite Hero: Endotracheal Tube Bite Guard and Fixation*. [Oral Presentation, Steinmetz Symposium, Union College, 2023].
4. **Wei J**, Jones A, Raranje C, Hao Y, Kim T, Price A, Henke A, Kim H, Maraghechi B, Laugeman E, Gach E, Hanson J, Hugo G, Zhu T. *An Automated Image Processing Workflow for Quantitative Analysis of Daily Treatment MRI Acquired at ViewRay MRI-LINAC system*. [Oral Presentation, 9th MR in RT Symposium, UCLA 2023].
5. **Wei J**, Gleason C. *Constructing Spin Density Matrix Elements in  $\gamma p \rightarrow \rho^- \Delta^{++}$  for the GlueX Experiment*. [Poster, New York Six Liberal Arts Consortium Undergraduate Research Conference, Colgate University, 2022].
6. **Wei J**, Gleason C. *Constructing Spin Density Matrix Elements in  $\gamma p \rightarrow \rho^- \Delta^{++}$  for the GlueX Experiment*. [Poster, Steinmetz Symposium, Union College, 2022].
7. **Wei J**, Rajendran K, Thorn J, Marsh J, Burke K, Leng S, McCollough CH. *Evaluation of a New Task-Based Automatic Dose and keV Selection Tool for Virtual Monoenergetic Imaging Using a Whole-Body Photon-Counting Detector CT*. [Poster, American Physical Society Conferences for Undergraduate Women in Physics (CUWiP) 2021].
8. **Wei J**, Rajendran K, Thorn J, Marsh J, Burke K, Leng S, McCollough CH. *Evaluation of a New Task-Based Automatic Dose and keV Selection Tool for Virtual Monoenergetic Imaging Using a Whole-Body Photon-Counting Detector CT*. [Poster, Mayo Clinic Summer Research Symposium 2021].
9. **Wei J**, Rieffel J. *Understanding Motions of Silicon Robot Through Quality Diversity Algorithms*. [Poster, Steinmetz Symposium, Union College, 2021].

## GRANTS AND SCHOLARSHIP

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<b>Student Conference Travel Grants, Union College</b> \$ 500	2023
Funding to attend 9th Magnetic Resonance in Radiation Therapy (MR in RT) symposium in Los Angeles, CA	
<b>Presidential Scholarship, Union College</b> \$ 20,000 per year	2019 - 2023
Merit-based scholarship awarded at the time of admission.	

## AWARDS AND HONORS

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<b>Sigma Pi Sigma</b> Member	June 2023 - Present
The Physics Honor Society. .	
<b>Omicron Delta Kappa</b> Member	November 2022 - Present
The National Leadership Honor Society scopes to give recognition and honor for meritorious leadership and service in academics and extracurricular activities and to encourage development of general campus citizenship.	
<b>Tau Beta Pi</b> Member	June 2022 - Present

The Engineering Honor Society. Membership is based on academic performance: rank in the top eighth of the junior class or the top fifth of the senior class of engineers.

**American Association of Medical Physics (AAPM)**

June 2022 - Present

*Student Member*

A scientific, educational, and professional organization of Medical Physicists.

**James Henry Turnbull (1929) Prize, Union College**

May 2021

*Awardee*

Awarded to the outstanding sophomore in Physics.

**Dean's List, Union College**

2019 - 2022

*Honoree*

Honor based on academic record and achievement. Students with at least a 3.50 grade point average for the entire academic year.

## SKILLS

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**Programming:** MATLAB, Python, C++, Arduino, LaTeX. **Data Analysis:** Mathematica, SPSS. **Software:** 3D Slicer, ITK-SNAP, Syngo.via, RayStation, SolidWorks, AutoDesk.

## LEADERSHIP AND ACTIVITIES

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**BME PhD Student Council**

Johns Hopkins University

*Council Member*

*September 2023 - Present*

- Organizeing events for BME PhD students.

**BMEAAP**

Johns Hopkins University

*Student Mentor*

*September 2023 - Present*

- Helping potential PhD applicants prepare application materials and providing mentoring through the process.

**Academic Affair Council**

Union College

*Committee Member*

*September 2021 - March 2023*

- Formulated and oversaw all changes in academic policy and all proposals for new programs.
- Provided advising on academic development, including both general direction for the entire academic program and appropriate goals for departments and programs.

**Asian Student Union**

Union College

*President*

*April 2021 - June 2022*

- Organized and foresaw multiple campus-wide events which aimed to share Asian heritages and arose awareness of diverse cultures.
- Served on the Leadership in Diversity Committee and worked with other multicultural clubs to promote diversity at Union College and in the Schenectady community.

**Union College Robotics Crew**

Union College

*President*

*September 2020 - March 2023*

- Provided technical training to new members in electrical design, circuit building, and microcontroller programming for micromouse competitions.
- Served as the primary liaison with faculty and students.
- Co-Chaired the 2022 IEEE Region 1 Micromouse Competition.