

# MING FANG

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1615 Melrose Park Ct, Apt 2022, Urbana, IL 61801, USA

## EDUCATION

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<b>PhD Student</b>   <i>Nuclear, Plasma, and Radiological Engineering</i> University of Illinois at Urbana-Champaign (UIUC) <ul style="list-style-type: none"><li>Cumulative GPA: 4.0 / 4.0</li></ul>	Jan 2020 – Present Urbana, USA
<b>Master of Science</b>   <i>Nuclear, Plasma, and Radiological Engineering</i> University of Illinois at Urbana-Champaign (UIUC) <ul style="list-style-type: none"><li>Cumulative GPA: 4.0 / 4.0</li></ul>	Aug 2018 – Dec 2019 Urbana, USA
<b>Bachelor of Engineering</b>   <i>Nuclear Engineering and Technology</i> University of Science and Technology of China (USTC) <ul style="list-style-type: none"><li>Cumulative GPA: 3.89 / 4.3</li></ul>	Sept 2014 – June 2018 Hefei, China

## RESEARCH INTEREST

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- Development of non-destructive assay methods of special material for the characterization of tri-structural isotropic particle (TRISO) fuel for pebble bed reactors.
  - Development of single-volume scatter camera with SiPM scintillator readout.
  - Radiation detector signal processing algorithms with a focus on accelerated Monte Carlo implementation and iterative linear inverse solver for image reconstruction.
  - Application of advanced radiation detection techniques, such as positron lifetime spectroscopy.

## RESEARCH EXPERIENCE

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<b>Multi-Mode Imaging for TRISO-fueled Pebble Identification</b> UIUC <ul style="list-style-type: none"><li>Designed a neutron multiplicity counter to perform non-destruction assay of fuel pebbles.</li><li>Implemented an accelerated Monte-Carlo algorithm to simulate X-ray images of a pebble generated by an industrial CT scanner.</li><li>Developed image reconstruction, image segmentation, and fuel pebble identification algorithms.</li><li>Contributed to the writing of the awarded Phase II STTR DOE grant.</li></ul>	Aug 2020 - Present Urbana, USA
<b>Quantitative Image Reconstruction in Passive Gamma Emission Tomography</b> UIUC <ul style="list-style-type: none"><li>Developed a linear forward model to characterize the imaging system response.</li><li>Implemented an accelerated Monte Carlo algorithm to perform scattering correction.</li><li>Developed a full set of software to reconstruct cross-sectional images of inspected fuel assemblies, identify missing fuel pins, and estimate fuel pin activities.</li></ul>	Aug 2019 – Sept 2020 Urbana, USA
<b>Active Interrogation Using a DD Neutron Generator</b> UIUC <ul style="list-style-type: none"><li>Implemented a shift-register algorithm to calculate the coincidence neutron count rate.</li><li>Demonstrated the possibility of using a DD generator as a neutron active interrogation source based on the strong correlation between the time-dependent neutron count rate signature and uranium mass.</li></ul>	May 2019 – May 2020 Urbana, USA
<b>Positron Annihilation Lifetime Spectroscopy (PALS)</b> UIUC <ul style="list-style-type: none"><li>Developed and optimized a PALS experimental setup using organic scintillators and fast digitizers.</li><li>Implemented an interpolation-based constant-fraction discrimination (CFD) timing algorithm to determine the pulse arrival time.</li></ul>	Jan 2019 – May 2019 Urbana, USA
<b>General-Purpose Pulse-Processing Program</b> UIUC	Sept 2018 – Present Urbana, USA

- Developed a fast and general-purpose pulse-processing program based on the CERN ROOT framework.

## Implementation of Key Algorithms in Gamma Spectrum Analysis Software

Jul 2017 – Mar 2018

USTC

Hefei, China

- Implemented pulse smoothing, peak finding and background subtraction algorithms in C++.
- Implemented energy calibration algorithm in C++.

## PUBLICATIONS

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### Peer-Reviewed Journal Publications

1. **Ming Fang**, Yoann Altmann, Daniele Della Latta, Massimiliano Salvatori, and Angela Di Fulvio. Quantitative imaging and automated fuel pin identification for passive gamma emission tomography. *Scientific reports*, 11(1):1–11, 2021
2. **Ming Fang**, Nathan Bartholomew, and Angela Di Fulvio. Positron annihilation lifetime spectroscopy using fast scintillators and digital electronics. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 943:162507, 2019
3. Ahmed Karam Eldaly, **Ming Fang**, Angela Di Fulvio, Stephen McLaughlin, Mike E Davies, Yoann Altmann, and Yves Wiaux. Bayesian activity estimation and uncertainty quantification of spent nuclear fuel using passive gamma emission tomography. *Journal of Imaging*, 7(10):212, 2021
4. Zhihua Liu, **Ming Fang**, Jon George, Ling-Jian Meng, and Angela Di Fulvio. Neutron tomography of spent fuel casks. *Journal of Signal Processing Systems*, pages 1–11, 2021
5. Matthew Weiss, **Ming Fang**, Yoann Altmann, Marc G. Paff, and Angela Di Fulvio. Effect of natural gamma background radiation on portal monitor radioisotope unmixing. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 2021
6. Noah Rebei, **Ming Fang**, and Angela Di Fulvio. Quantitative and three-dimensional assessment of holdup material. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 984:164630, 2020

### Proceedings at International Conferences

1. **Ming Fang** and Angela Di Fulvio. Boron coated straw-based neutron multiplicity counter for neutron interrogation of triso fueled pebbles. Virtual Conference, July 2022. INMM 63rd Annual Meeting
2. **Ming Fang** and Angela Di Fulvio. Algorithms for TRISO Fuel Identification Based on X-ray CT. 2022ANS Annual Meeting, June 2022
3. **Ming Fang**, Satwik Pani, and Angela Di Fulvio. Enabling PSD-capability for a High-density Channel Imager. In *2021 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*, Yokohama, Japan, December 2021. IEEE
4. **Ming Fang** and Angela Di Fulvio. Multi-Mode Imaging for TRISO-fueled Pebble Identification. ANS Student Conference 2021, April 2021
5. **Ming Fang**, Yoann Altmann, Daniele Della Latta, Massimiliano Salvatori, and Angela Di Fulvio. Attenuation and Scattering Correction in Passive Gamma Emission Tomography Reconstruction. Boston, MA, USA, December 2020. 2020 IEEE NSS-MIC
6. **Ming Fang**, Daniele Della Latta, Yoann Altmann, Massimiliano Salvatori, and Angela Di Fulvio. Computational Methods for Pin Identification in Passive Gamma Emission Tomography. Baltimore, Maryland, USA, July 2020. INMM 61st Annual Meeting
7. **Ming Fang**, Nathan Bartholomew, and Angela Di Fulvio. Timing performance of organic scintillators for positron annihilation lifetime spectroscopy. In *2019 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*, pages 1–5. IEEE

## PRESENTATIONS AT INTERNATIONAL CONFERENCES

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1. Boron coated straw-based neutron multiplicity counter for neutron interrogation of triso fueled pebbles (oral). Virtual Conference, July 2022. INMM 63rd Annual Meeting
2. Algorithms for TRISO Fuel Identification Based on X-ray CT (oral). Anaheim, CA, USA, June 2022. 2022 ANS Annual Meeting
3. Enabling psd-capability for a high-density channel imager (oral). Virtual Conference, December 2021. 2021 IEEE Nuclear Science Symposium and Medical Imaging Conference
4. Multi-mode imaging for triso-fueled pebble identification (oral). Virtual Conference, April 2021. ANS Student Conference 2021
5. Comparison of image reconstruction methods for simulated passive gamma emission tomography (oral). Virtual Conference, November 2020. 2020 IEEE Nuclear Science Symposium and Medical Imaging Conference
6. Computational methods for pin identification in passive gamma emission tomography (oral). Virtual Conference, July 2020. INMM 61st Annual Meeting
7. Positron annihilation lifetime spectroscopy using fast scintillators and digital electronics (poster). Manchester, UK, November 2019. 2019 IEEE Nuclear Science Symposium and Medical Imaging Conference

## APPOINTMENTS

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<b>Graduate Research Assistant</b> Neutron Measurement Laboratory	Sept 2018 – Present Urbana, USA
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## TEACHING AND MENTORING

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<b>Outreach Activities</b> UIUC	Mar 2020 Urbana, USA
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- Coordinated lab tour for the Academic Redshirt in Science and Engineering (ARISE).

<b>Mentor</b> UIUC	Sept 2018 – Present Urbana, USA
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- Jacob Fritchie, Undergraduate student.
- Satwik Pani, Undergraduate student.
- Muzammil Siddiqui, Undergraduate student.
- Noah Rebei, High school student, University Laboratory High School.

<b>Undergraduate Teaching Assistant</b> USTC	Sept 2017 – Jan 2018 Hefei, China
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- Course: Physics, Subject: Quantum Mechanics B.

## SKILLS

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**Programming:** C/C++, OpenMP/MPI, Python (NumPy, SciPy, Matplotlib), Bash, Java

**Document Creation:**  $\text{\LaTeX}$ , Markdown, Microsoft Office Suite

**Software:** MCNP, MATLAB, Mathematica, ROOT, Git, CMake/Make, SOLIDWORKS, OrCAD Capture and PCB Editor, Origin, Vivado

## HONORS AND AWARDS

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<b>J.D. Williams Student Paper Award, Second Place</b> Institute of Nuclear Materials Management 63rd Annual Meeting	July 2022
<b>ACDIS Summer 2022 Fellowship</b> The Program in Arms Control & Domestic and International Security (ACDIS), UIUC	May 2022
<b>Fellow of Exotic Beam Summer School</b> Oak Ridge National Laboratory	June 2019
<b>Outstanding Teaching Assistant</b> USTC	Mar 2018
<b>Outstanding Student Scholarship</b> USTC	May 2017
<b>Institute of Modern Physics, Chinese Academy of Sciences Scholarship</b> USTC	Sept. 2017
<b>Outstanding Student Scholarship</b> USTC	May 2016
<b>Institute of Modern Physics, Chinese Academy of Sciences Scholarship</b> USTC	Sept. 2015
<b>Outstanding Freshman Scholarship</b> USTC	Sept. 2014

## PROFESSIONAL SOCIETIES

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- Student member of Institute of Nuclear Materials Management
- Student member of American Nuclear Society