

# Carnegie Mellon University

## Manufacturing Futures Institute (MFI) Postdoctoral Fellowship Program

### I. About the MFI Postdoctoral Fellowship Program

The MFI Postdoctoral Fellowship Program seeks candidates that will support the vision of MFI by demonstrating research excellence and leadership in addressing challenges that further the digitalization of manufacturing. Example research themes, when applied to advanced manufacturing, include, but are not limited to: additive manufacturing, augmented/virtual reality (AR/VR) systems, artificial intelligence (AI), cybersecurity, digital thread, digital twins, future of work, industrial internet of things (IIoT), intelligent robotics, materials discovery, process control, and sustainability. To perform such research, successful candidates will have experience and interest in relevant cross-disciplinary collaborations.

Proposed research must demonstrate a clear fit with the mission and areas of academic inquiry and translational opportunity of MFI. Both internal and external applicants will be considered. **Applicants will need confirmed commitment from a CMU faculty mentor** to be considered. Fellowship appointments will be for one year with the option for potential renewal, subject to annual performance review and availability of funds.

### II. About MFI and Carnegie Mellon University

Carnegie Mellon University's [Manufacturing Futures Institute \(MFI\)](#) is a campus-wide institute whose mission is to bring together all facets of Carnegie Mellon excellence to inspire and engineer the world's premier technological advances in agile, intelligent, efficient and resilient manufacturing. We own a culture of collaboration and activate across disciplines to create and conduct groundbreaking research that exploits the rapid pace of innovation for advancing manufacturing, to educate, empower and inspire manufacturing innovators and leaders through experiential learning, and to inspire fundamental discoveries and accelerate their translation toward commercialization.

We enable the digitalization of manufacturing and enhance the requisite human workforce through integration of advanced cyberinformation technologies, including, but not limited to, AR/VR, AI, cloud computing, cybersecurity, data analytics, IIoT, machine learning, simulation and virtual modeling. The appropriate infusion of these modern-era information technologies into manufacturing environments holds the potential to create new paradigms and policies when merged with advanced manufacturing technologies such as additive manufacturing, robotics and automation, micro/nanofabrication, and modular processing. MFI also seeks to incorporate cross-cutting areas of social sciences to applications in the digitalization of manufacturing, including the infusion of learning science to accelerate workforce development, technology-based policy to accelerate technology adoption, and ethics to provide a compass toward the future.

MFI operates 58,000 square feet (sf) of advanced manufacturing space at Mill 19 in Hazelwood Green on the Monongahela River, just a few miles from campus, to support industry-relevant and scalable research and development. MFI at Mill 19 is being developed as a shared workspace to incentivize

innovation across areas and projects and to work alongside visiting industry and government collaborators. The facility includes 6750 sf of high bay space available for large-format workcells, 13,300 sf of flexible low bay space available for future factory technologies, a 2300 sf metals additive manufacturing facility and a machine shop to support research and operations.

**Why Carnegie Mellon:** Fields pioneered at Carnegie Mellon – e.g., additive manufacturing, artificial intelligence, cyber-physical systems, robotics, and the science of learning – are among the key technologies transforming production and the future of products. Today, CMU researchers are discovering new advanced manufacturing breakthroughs – from varying metal microstructure within 3D-printed parts, to 3D-printing tissue scaffolds as human transplants, to using AI and digital twins for intelligent robotic processing, to merging AR and VR worlds in a scalable networked platform. CMU is a global leader in computer science, boasting nine Turing Award winning-faculty, plus three alumni, having defined the field of machine learning, and having the only machine learning department in the world. CMU has also led the world in computational tools in design, innovation and entrepreneurship: Integrated Product Development set the standard for courses of its kind, and Quantitative Entrepreneurship is one-of-a-kind in its methods. CMU’s company spin-out rate is the highest of any U.S. academic institution per federal research dollar invested, with half of CMU spinouts in manufacturing. CMU’s Robotics Institute, founded in 1979, is the leading robotics research institute in the world. Launched in 2015, CMU’s NextManufacturing Center is a recognized leader in additive manufacturing research and education. CMU’s Simon Initiative has been transforming education through the science of learning. Finally, CMU is the leader in solving policy problems where the technical details matter. This world leadership in advanced manufacturing technologies, artificial intelligence, integrated design and entrepreneurship, the science of learning, and technology policy, coupled with CMU’s unparalleled ability to work problems at disciplinary boundaries, and the generous capital and infrastructure investment of a private donor, are enabling CMU to envision and accelerate the world into the physical and artificial future unlike any other.

### III. Eligibility

- Completion of PhD or ScD prior to start date
- No more than two years past the date of the doctoral degree at the time of appointment
- Internal and external candidates will be considered

### IV. Application

Applicants are required to submit the following materials. Applications will be judged on the qualifications of the applicant, and the quality and applicability of the proposed research to the mission and goals of the Manufacturing Futures Initiative and its potential impact.

- Thesis abstract – one page
- Research proposal – 700-1,000 words (not including references and citations). Research proposals must be aligned with the mission and research thrusts of MFI. Proposals should be of high overall technical quality, represent novel, interdisciplinary research, and include a clear plan for how the contribution helps grow advanced manufacturing activity at CMU with particular attention to Mill

19. Submissions should also convey the impact of the proposed research, including, as applicable, social, economic, policy, and regional impact as well as the potential of the research to generate additional funding.

- Education and background statement – 500-700 words describing your personal background and contributions to advanced manufacturing through your academic career
- Curriculum vitae including publication list
- Two letters of recommendation including one from the applicant’s PhD thesis advisor, to be sent directly to [CMU-MFI@andrew.cmu.edu](mailto:CMU-MFI@andrew.cmu.edu), that provide detailed assessments of the applicant’s qualifications and potential for innovative, ground-breaking independent research
- Letter of support from the CMU faculty mentor who will advise you during your fellowship appointment addressing:
  - applicant’s planned research
  - extent to which the applicant will participate in department and campus activities and programs
  - facilities and resources available to the fellow
  - statement confirming that the faculty mentor’s department chair supports the items above

NOTE: Applicants are encouraged to contact [faculty members currently affiliated with MFI](#) as well as faculty members with research interests that could support MFI.

#### V. Tenure

The tenure of the postdoctoral fellowship will be 12 months. Postdoctoral fellowships may not be deferred or delayed. Appointments may be renewed, subject to annual review and consideration.

#### VI. Stipend and Benefits

- One-year stipend: \$60,000
- Carnegie Mellon University full-time staff benefits
- \$10,000 will be provided for discretionary research expenses including travel

#### VII. Submission Procedure

- Due date – applications will be accepted on a rolling basis. Due to budget considerations, there may be a limited number of postdoctoral fellowships available at any given time.
- Submission process – application materials must be submitted via [Careers @ Carnegie Mellon](#).
- Two letters of recommendation including one from the applicant’s PhD thesis advisor, to be sent directly to [CMU-MFI@andrew.cmu.edu](mailto:CMU-MFI@andrew.cmu.edu).
- Candidates will be notified of a decision upon review of their complete application. This process may take up to 60 days, but typically is no more than 30 days.

- Formal acceptance of the fellowship must be made in writing no later than 30 days after an award notification has been made.

#### VIII. Requirements

- Successful background check