The NSF AI Institute for Artificial Intelligence and Fundamental Interactions (IAIFI) is one of the inaugural NSF AI research institutes. The IAIFI will enable physics discoveries and advance foundational AI through the development of novel AI approaches that incorporate first principles from fundamental physics. AI is transforming many aspects of society, including the ways that scientists are pursuing groundbreaking discoveries. For many years, physicists have been at the forefront of applying AI methods to investigate fundamental questions about the Universe. Further progress will require a revolutionary leap in AI, as both the complexity of physics problems and the size of physics datasets continue to grow.

The goal of the IAIFI is to develop and deploy the next generation of AI technologies, based on the transformative idea that artificial intelligence can directly incorporate physics intelligence. IAIFI researchers will use these new AI technologies to tackle some of the most challenging problems in physics, from precision calculations of the structure of matter, to gravitational wave detection of merging black holes, to the extraction of new physical laws from noisy data. IAIFI researchers will also transfer these technologies to the broader AI community, since trustworthy AI is as important for physics discovery as it is for other applications of AI in society. To cultivate human intelligence, the IAIFI will promote training, education, and outreach at the intersection of physics and AI. In this way, the IAIFI will advance physics knowledge – from the smallest building blocks of nature to the largest structures in the Universe – and galvanize AI research innovation.

For more information about proposed IAIFI research areas, visit http://iaifi.org/.

Of critical importance to the IAIFI vision is our IAIFI Fellows program, which aims to recruit and train the most talented, promising, and diverse group of researchers at an early stage of their careers. These Fellows will spark vital interdisciplinary, multi-investigator, multi-subfield collaborations. Such collaborations have immense power to generate new ideas and approaches, facilitate abstracting physics challenges beyond their native domains, and instill a common language across disciplines. Our program aims to appoint three new postdoctoral IAIFI Fellows each academic year, for a three-year fellowship term each.

Fellows will be selected through an annual application process. Applicants should have or be expected to receive by the 1st of September 2022, a PhD in Physics, Statistics, Computer Science, or a related field. Applicants must be nominated by a faculty member or senior researcher, and applicants will be asked to provide contact information for the nominator during the application process. The nominator will then be contacted to confirm eligibility. Complete applications must include:

Cover letter (no more than 1 page); CV (1-2 pages recommended, but longer accepted); Statement of research interests (no more than 2 pages); List of publications; Exactly three reference letters (including one nominator); Nomination confirmation (must overlap with one reference).

The deadline to receive all the materials (including all reference letters) is the 21st of September 2021.

The Fellows will have substantial freedom in choosing their research focus; each fellow will be assigned two mentors – one from Physics and one from AI – to guide their choice of research topic and evaluate their research progress. The IAIFI is committed to building a culturally diverse intellectual community, and strongly encourages applications from members of historically marginalized groups. Any inquiries about the program should be directed to iaifi-fellows@mit.edu.

The IAIFI is a joint NSF-funded venture between MIT, Harvard, Northeastern, and Tufts. Fellows are encouraged to collaborate with other IAIFI members and can have affiliations with any or all of the participating universities.

MIT is an equal employment opportunity employer. All qualified applicants will receive consideration for employment and will not be discriminated against on the basis of race, color, sex, sexual orientation, gender identity, religion, disability, age, genetic information, veteran status, ancestry, or national or ethnic origin. MIT's full policy on Nondiscrimination can be found here.