PhD in Physics, Statistics, and Data Science

The **Interdisciplinary PhD in Physics, Statistics, and Data Science** is a collaboration among the MIT Physics Department, MIT Statistics and Data Science Center (SDSC), and IAIFI.

The Interdisciplinary PhD in Statistics (IDPS) is designed for students currently enrolled in an MIT doctoral program who wish to develop their understanding of 21st century statistics, using concepts of computation and data analysis as well as elements of classical statistics and probability within their chosen field of study.

Requirements

- Satisfy all requirements of MIT Physics PhD (you are allowed to double count courses)
- Participate in the Doctoral Seminar in Statistics
- Take 4 classes, 1 each in **Probability**, **Statistics**, **Computation & Statistics**, and **Data Analysis**
- Submit and defend a PhD thesis that involves the utilization of statistical methods in a substantial way

Course Options

Courses in this list that satisfy the Physics PhD degree requirements can count for both programs. Other similar or more advanced courses can count towards the "Computation & Statistics" and "Data Analysis" requirements, with permission from the program co-chairs. The IDS.190 requirement may be satisfied instead by IDS.955 Practical Experience in Data, Systems, and Society, if that experience exposes the student to a diverse set of topics in statistics and data science. Making this substitution requires permission from the program co-chairs prior to doing the practical experience.

- **SEMINAR**
  - IDS.190 – Doctoral Seminar in Statistics and Data Science
    (*may be substituted by IDS.955 Practical Experience in Data, Systems and Society*)
- **PROBABILITY**
  - 6.7700[J] Fundamentals of Probability ***or***
  - 18.675 – Theory of Probability
- **STATISTICS**
  - 18.655 – Mathematical Statistics ***or***
  - 18.6501 – Fundamentals of Statistics ***or***
  - IDS.160[J] – Mathematical Statistics: A Non-Asymptotic Approach
- **COMP & STAT**
  - 6.C01/6.C51 – Modeling with Machine Learning: From Algorithms to Applications ***or***
  - 6.7810 Algorithms for Inference ***or***
  - 6.8610 (6.864) Advanced Natural Language Processing ***or***
  - 6.7900 (6.867) Machine Learning ***or***
  - 6.8710 (6.874) Computational Systems Biology: Deep Learning in the Life Sciences ***or***
  - 9.520[J] – Statistical Learning Theory and Applications ***or***
  - 16.940 – Numerical Methods for Stochastic Modeling and Inference ***or***
  - 18.337 – Numerical Computing and Interactive Software
- **DATA ANALYSIS**
  - 8.316 – Data Science in Physics ***or***
  - 6.8300 (6.869) Advances in Computer Vision ***or***
  - 8.334 – Statistical Mechanics II ***or***
  - 8.371[J] – Quantum Information Science ***or***
  - 8.591[J] – Systems Biology ***or***
  - 8.592[J] – Statistical Physics in Biology ***or***
  - 8.942 – Cosmology ***or***
  - 9.583 – Functional MRI: Data Acquisition and Analysis ***or***
  - 16.456[J] – Biomedical Signal and Image Processing ***or***
  - 18.367 – Waves and Imaging ***or***
  - IDS.131[J] – Statistics, Computation, and Applications

MIT Physics

MIT STATISTICS + DATA SCIENCE CENTER

IAIFI