

APPLIED PHYSICS

Contact Information

Applied Physics

<https://appliedphysics.rice.edu/>

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Junichiro Kono

Program Director

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The Applied Physics Graduate Program (APP) is a joint effort of the [Wiess School of Natural Sciences](https://naturalsciences.rice.edu/) and the [George R. Brown School of Engineering and Computing](https://engineering.rice.edu/), under the aegis of the Office of Research and overseen by the [Smalley-Curl Institute \(SCI\)](https://sci.rice.edu/). The program seeks to provide a truly interdisciplinary graduate education. Due to the interdisciplinary nature of the program, students can utilize research facilities in either the natural sciences or engineering schools of Rice University, as well as institutions in the Texas Medical Center.

Through rigorous coursework, APP students acquire a solid background in physics, including quantum mechanics, physics, electrodynamics, and statistical mechanics. Students then use their knowledge in solid state physics to address and solve cutting-edge applied research problems. Currently, APP students are actively conducting research in photonics and plasmonics, nanomaterials and nanodevices, quantum science and engineering, neuroengineering and biotechnology, and theory and computation.

Applied Physics does not currently offer an academic program at the undergraduate level.

Master's Program

- Master of Science (MS) Degree in the field of Applied Physics*

Doctoral Program

- Doctor of Philosophy (PhD) Degree in the field of Applied Physics (<https://ga.rice.edu/programs-study/departments-programs/interdisciplinary/applied-physics/applied-physics-phd/>)

* Although students are not directly admitted to a Master of Science (MS) degree program, graduate students must earn the MS in lieu of a qualifying exam as they work toward the PhD. Students may also request for consideration that an MS earned at a previous institution be accepted.

Program Director

Junichiro Kono

Committee for Curriculum and Admissions

Alessandro Alabastri, *Electrical and Computer Engineering*

Songtao Chen, *Electrical and Computer Engineering*

Nai-Hui Chia, *Computer Science*

Anna-Karin Gustavsson, *Chemistry*

Lan Luan, *Electrical and Computer Engineering*

Shengxi Huang, *Electrical and Computer Engineering*

Junichiro Kono, *Electrical and Computer Engineering*

Hae Yeon Lee, *Materials Science and NanoEngineering*

Xuedan Ma, *Materials Science and NanoEngineering*

Kevin Slagle, *Electrical and Computer Engineering*

Ming Yi, *Physics and Astronomy*

Hanyu Zhu, *Materials Science and NanoEngineering*

Advisors

Pulickel M. Ajayan

Alessandro Alabastri

Richard G. Baraniuk

Anthony A. Chan

Songtao Chen

Pengcheng Dai

Pramod Dash

Kathryn Jane Grande-Allen

Anna-Karin Gustavsson

Naomi J. Halas

Yimo Han

Randall G. Hulet

Caleb Kemere

Thomas C. Killian

Anatoly B. Kolomeisky

Junichiro Kono

Lan Luan

Jianpeng Ma

Amanda Marciel

Aditya D. Mohite

Emilia Morosan

Gururaj Naik

Douglas Natelson

Andriy Nevidomskyy

Peter Norlander

Guido Pagano

Xaq Pitkow

Robert M. Raphael

Jacob Robinson

Harel Shouval

Jerzy Szablowski

Ming Tang

James M. Tour

Ashok Veeraraghavan

Rafael Verduzco

Julea Vlassakis

Geoff Wehmeyer

Peter G. Wolynes

Michael S. Wong

Chong Xie

Yonglong Xie

Ming Yi

Hanyu Zhu

Note: Due to the interdisciplinary nature of the Applied Physics Program (APP), advisors include or have included faculty in either the Wiess School of Natural Sciences or the George R. Brown School of Engineering and Computing at Rice University, as well as faculty at the Texas Medical Center. Faculty currently advising APP students are listed above or at the *Current Advisors* tab of the [Applied Physics website \(https://appliedphysics.rice.edu/people/advisors/\)](https://appliedphysics.rice.edu/people/advisors/).

For Rice University degree-granting programs:

To view the list of official course offerings, please see [Rice's Course Catalog \(https://courses.rice.edu/admweb!/SWKSCAT.cat?p_action=cata\)](https://courses.rice.edu/admweb!/SWKSCAT.cat?p_action=cata).

To view the most recent semester's course schedule, please see [Rice's Course Schedule \(https://courses.rice.edu/admweb!/SWKSCAT.cat\)](https://courses.rice.edu/admweb!/SWKSCAT.cat).

Applied Physics (APPL)

APPL 490 - RQI - REU SUMMER RESEARCH PROGRAM

Short Title: UNDERGRAD SUMMER RESEARCH-REU

Department: Applied Physics

Grade Mode: Standard Letter

Course Type: Research

Credit Hours: 1-6

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Upper-Level

Description: Research experience under supervision of graduate students and faculty. Summer semester only. Department Permission Required.

APPL 500 - INTRODUCTION TO APPLIED PHYSICS

Short Title: INTRO APPL PHYS

Department: Applied Physics

Grade Mode: Standard Letter

Course Type: Lecture/Laboratory

Credit Hours: 3

Restrictions: Enrollment is limited to Graduate level students. Enrollment limited to students in the Applied Physics department.

Course Level: Graduate

Description: This is a required course for first-year students in the Applied Physics Graduate Program (APP), introducing them to the multidisciplinary research field of applied physics and facilitating their laboratory affiliation process. Through a series of tutorial lectures, students will acquire familiarity with cutting-edge research topics in various subfields of applied physics, including quantum information engineering, low-dimensional materials, ultracold atoms, nanophotonics, plasmonics and metamaterials, and neuroengineering. Furthermore, students will gain hands-on research experience in trial projects provided by different laboratories in APP through mini-rotations (3 weeks per laboratory). The primary goal of this course is to assist first-year APP students to find Ph.D. advisors by the end of the fall semester so they can start Ph.D. research in the spring semester. Additionally, this course aims to provide first-year APP students with an opportunity to develop a genuine camaraderie within the cohort by spending time together. Furthermore, each first-year student will be mentored by a senior APP student throughout the semester to get fully integrated into the program and the Rice community. Recommended Prerequisite(s): Understanding of undergraduate-level classical and quantum mechanics, electromagnetism, statistical mechanics, and solid-state physics

APPL 677 - SPECIAL TOPICS

Short Title: SPECIAL TOPICS

Department: Applied Physics

Grade Mode: Standard Letter

Course Type: Independent Study, Internship/Practicum, Laboratory, Lecture, Seminar, Lecture/Laboratory

Credit Hours: 1-4

Restrictions: Enrollment is limited to Graduate or Visiting Graduate level students.

Course Level: Graduate

Description: Topics and credit hours may vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.

APPL 750 - INTERNATIONAL RESEARCH INTERNSHIP

Short Title: INTERNATIONAL RESEARCH INTERN

Department: Applied Physics

Grade Mode: Standard Letter

Course Type: Internship/Practicum

Credit Hours: 3

Restrictions: Enrollment is limited to Graduate level students.

Course Level: Graduate

Description: Research internship in a foreign laboratory at institutes and universities in Mainz, Germany and Toulouse, France. Department Permission Required.

APPL 800 - RESEARCH AND THESIS

Short Title: RESEARCH AND THESIS

Department: Applied Physics

Grade Mode: Standard Letter

Course Type: Research

Credit Hours: 1-15

Restrictions: Enrollment is limited to Graduate level students.

Course Level: Graduate

Description: Thesis research under the supervision of faculty. Repeatable for Credit.

Description and Code Legend

Note: Internally, the university uses the following descriptions, codes, and abbreviations for this academic program. The following is a quick reference:

Course Catalog/Schedule

- Course offerings/subject codes: Courses from various subjects may apply towards this program

Department (or Program) Description and Code

- Applied Physics: APPL

Graduate Degree Descriptions and Codes

- Master of Science degree: MS
- Doctor of Philosophy degree: PhD

Graduate Degree Program Descriptions and Codes

- Degree Program for Applied Physics students in Bioengineering: APBI
- Degree Program for Applied Physics students in Chemical and Biomolecular Engineering: APCB
- Degree Program for Applied Physics students in Chemistry: APCH
- Degree Program for Applied Physics students in Computational and Applied Mathematics: APCA
- Degree Program for Applied Physics students in Earth Science: APEA

- Degree Program for Applied Physics students in Electrical Engineering: APEL
- Degree Program for Applied Physics students in Materials Science and NanoEngineering: APMS
- Degree Program for Applied Physics students in Mechanical Engineering: APME
- Degree Program for Applied Physics students in Physics: APPH
- Degree Program for Applied Physics students in Statistics: APST
- Degree Program offered to students in Applied Physics (1st year students only): APPL

CIP Code and Description ¹

- **APBI** Major/Program: CIP Code/Title: 14.1201 - Engineering Physics/
Applied Physics
- **APCA** Major/Program: CIP Code/Title: 14.1201 - Engineering Physics/
Applied Physics
- **APCB** Major/Program: CIP Code/Title: 14.1201 - Engineering Physics/
Applied Physics
- **APCH** Major/Program: CIP Code/Title: 40.0899 - Physics, Other
- **APEA** Major/Program: CIP Code/Title: 40.0899 - Physics, Other
- **APEL** Major/Program: CIP Code/Title: 14.1201 - Engineering Physics/
Applied Physics
- **APME** Major/Program: CIP Code/Title: 14.1201 - Engineering Physics/
Applied Physics
- **APMS** Major/Program: CIP Code/Title: 14.1201 - Engineering Physics/
Applied Physics
- **APPH** Major/Program: CIP Code/Title: 40.0899 - Physics, Other
- **APPL** Major/Program: CIP Code/Title: 40.0899 - Physics, Other
- **APST** Major/Program: CIP Code/Title: 14.1201 - Engineering Physics/
Applied Physics

¹ Classification of Instructional Programs (CIP) 2020 Codes and Descriptions from the National Center for Education Statistics: <https://nces.ed.gov/ipeds/cipcode/>.