This handbook provides general guidelines for ECE M.S./Ph.D. students. All degree plans and graduate student matters must conform to the Rice University General Announcements and the ECE course plan, and be approved by the ECE Graduate Committee. In addition, it is the student’s responsibility to become familiar with the contents of this handbook and to comply with all regulations, policies, procedures and deadlines, including the university honor code.
# TABLE OF CONTENTS:

<table>
<thead>
<tr>
<th>I. ABOUT THE M.S./PH.D. IN ECE</th>
<th>.............................................</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honor Code</td>
<td>.............................................</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. ADMINISTRATION/GENERAL INFORMATION</th>
<th>.............................................</th>
<th>4-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Department Partners</td>
<td>.............................................</td>
<td>4</td>
</tr>
<tr>
<td>Mail</td>
<td>.............................................</td>
<td>5</td>
</tr>
<tr>
<td>ESTHER</td>
<td>.............................................</td>
<td>5</td>
</tr>
<tr>
<td>Student Health Services</td>
<td>.............................................</td>
<td>5</td>
</tr>
<tr>
<td>Technology Support</td>
<td>.............................................</td>
<td>5</td>
</tr>
<tr>
<td>International Student Information</td>
<td>.............................................</td>
<td>6</td>
</tr>
<tr>
<td>Graduate Studies Form Library</td>
<td>.............................................</td>
<td>6</td>
</tr>
<tr>
<td>Employment</td>
<td>.............................................</td>
<td>7</td>
</tr>
<tr>
<td>Stipend/Summer Support</td>
<td>.............................................</td>
<td>7</td>
</tr>
<tr>
<td>Vacation/Time Off</td>
<td>.............................................</td>
<td>7</td>
</tr>
<tr>
<td>Departmental Responsibilities</td>
<td>.............................................</td>
<td>8</td>
</tr>
<tr>
<td>GSA Information</td>
<td>.............................................</td>
<td>8</td>
</tr>
<tr>
<td>ECE GSA Information</td>
<td>.............................................</td>
<td>9</td>
</tr>
<tr>
<td>Women ExCEI</td>
<td>.............................................</td>
<td>9</td>
</tr>
</tbody>
</table>

| III. GENERAL ANNOUNCEMENTS            | ............................................. | 9-10 |

<table>
<thead>
<tr>
<th>IV. M.S./Ph.D. TIMELINE</th>
<th>.............................................</th>
<th>11-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>.............................................</td>
<td>11</td>
</tr>
<tr>
<td>Year 2 and Thesis Defense</td>
<td>.............................................</td>
<td>11</td>
</tr>
<tr>
<td>Years 3-8</td>
<td>.............................................</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V. ACADEMICS</th>
<th>.............................................</th>
<th>12-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science (M.S.) Program</td>
<td>.............................................</td>
<td>12</td>
</tr>
<tr>
<td>Previous Master’s (Non-Rice)</td>
<td>.............................................</td>
<td>13</td>
</tr>
<tr>
<td>Doctor of Philosophy (Ph.D.) Program</td>
<td>.............................................</td>
<td>13</td>
</tr>
<tr>
<td>ELEC 699 Seminar</td>
<td>.............................................</td>
<td>14</td>
</tr>
<tr>
<td>Ph.D. Qualifier – ELEC 599</td>
<td>.............................................</td>
<td>14</td>
</tr>
<tr>
<td>Academic and Research Advisors</td>
<td>.............................................</td>
<td>16</td>
</tr>
<tr>
<td>Annual Review</td>
<td>.............................................</td>
<td>16</td>
</tr>
<tr>
<td>Candidacy and Defense</td>
<td>.............................................</td>
<td>17</td>
</tr>
<tr>
<td>Grievances and Problem Resolution</td>
<td>.............................................</td>
<td>20</td>
</tr>
<tr>
<td>Changes in Research Group, Program, or Department</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>ECE Areas of Study</td>
<td>.............................................</td>
<td>21</td>
</tr>
<tr>
<td>Degree Plan</td>
<td>.............................................</td>
<td>22</td>
</tr>
<tr>
<td>ESTHER</td>
<td>.............................................</td>
<td>22</td>
</tr>
<tr>
<td>Guidelines for Independent Study</td>
<td>.............................................</td>
<td>23</td>
</tr>
<tr>
<td>Grades, Department Duties, Academic Status</td>
<td>.............................................</td>
<td>23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VI. IMPORTANT LINKS AND DATES</th>
<th>.............................................</th>
<th>24-28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Links</td>
<td>.............................................</td>
<td>24</td>
</tr>
<tr>
<td>Dates</td>
<td>.............................................</td>
<td>25</td>
</tr>
<tr>
<td>Help Available</td>
<td>.............................................</td>
<td>25</td>
</tr>
</tbody>
</table>

| VII. DEPARTMENT DIRECTORY              | ............................................. | 28 |
I. ABOUT THE M.S./PH.D. IN ECE

Welcome to the Rice University Department of Electrical and Computer Engineering (ECE)! Your admission to Rice is the latest milestone in an exemplary academic career. At Rice, researchers and faculty members at the forefront of their fields will guide you. You will be taught to think creatively, be a part of a network of knowledge, and redefine your own limits.

The Ph.D. program prepares students for research careers in academia and industry. Students admitted to the Ph.D. program with a bachelor’s degree are required to complete 90 hours of credit (typically 36 hours of coursework and 54 hours of research).

Honor Code
All incoming Rice students agree to abide by the Rice University honor system. The honor system, one of the oldest and proudest traditions at Rice, is administered by the Honor Council, whose student members are elected each year by the student body. Adopted by a student vote in 1916, the honor system has remained essentially the same since that time but for changes in the procedures and membership of the Honor Council.

Students take all written examinations and complete any specifically designated assignments under the honor system. By committing themselves to the honor system, all students accept responsibility for assuring the integrity of the examinations and assignments conducted under it. More information can be found at ga.rice.edu.

II. ADMINISTRATION

Your Department Partners
ECE graduate students are welcome to ask for assistance when it is needed. ECE administrative staff and the Engineering Graduate Program staff are all available to answer questions. A directory can be found in Section VII.

In addition, each incoming Ph.D. student will be assigned two seasoned ECE graduate students, one in the student’s primary area of research and one from another area. Mentors will assist first-year students in academic matters, including preparation for ELEC 599, and
social interaction with members of ECE and other interdisciplinary departments. Mentor/mentee social events will be planned over the course of the first year by the Student Mentor Committee.

**Mail**

ECE graduate student mailboxes can be found in Abercrombie Room A239. FedEx and UPS Packages are received in Abercrombie A204.

**ESTHER**

ESTHER is the web application for students, faculty and staff. Students will use this application to register for classes and retrieve certain data such as grades and account information. Using ESTHER, students can: update contact information; register, add and drop courses; access final grades; view holds on accounts, etc. See registrar.rice.edu/students/esther_FAQs/ for information about how to use ESTHER.

**Student Health Services**

Student Health Insurance: Rice University requires all degree-seeking students to have health insurance. Students electing to enroll in the Rice Student Health Plan may opt to be billed annually or semi-annually. Contact the Student Health Insurance office for enrollment information and payment options. Studenthealthinsurance.rice.edu, email studentinsurance@rice.edu. You must complete an insurance waiver form to forego the Rice health plan.

Health Data Form (HDF): All new graduate students are required to submit a properly completed HDF to Student Health. All students under the age of 22 years, regardless of classification, must provide documentation of vaccination against meningococcal disease. See health.rice.edu for more information.

International Student Health Information: All Rice-sponsored F-1 and J-1 international students must enroll in either 1) Aetna (Rice’s Student Health Insurance Plan) or 2) SAS (Rice’s Approved Alternate Health Insurance Plan for Internationals). Visit oiss.rice.edu/studenthealth/ for more information.

**Technology Support**

From creating websites, paper publication citations, to research collaboration, the department has a plethora of technology resources available, as well as policies users must adhere to. See ece.rice.edu for
more information.

**International Student Information**
International Student Newsletters can be found at [http://oiss.rice.edu/news/](http://oiss.rice.edu/news/) and more information is in Section VI of this handbook. See [oiss.rice.edu/](http://oiss.rice.edu/) for details on international student internships with regard to Optional Practical Training (OPT) and Curricular Practical Training (CPT).

**Graduate Studies Form Library**
The Office of Graduate and Postdoctoral Studies (GPS) keeps a very useful library of commonly needed forms for everything from leaves of absence to candidacy petition to thesis submission. Visit [graduate.rice.edu/forms](http://graduate.rice.edu/forms) for more information.

**Specific forms include:**
- **Enrollment**
  - Leave of Absence
  - Short Term Medical and Parental Leave
  - Withdrawal
- **Registration Forms**
- **Transfer Credit Forms**
- **Candidacy**
  - Candidacy Petition Instructions
  - Candidacy Petitions
  - Request for Extension of time to Candidacy
- **Thesis Defense**
  - Thesis Defense Instructions
  - Webform to Announce Defense as required by General
  - Request for Extension of Time to Defense
- **Thesis Submission**
  - Thesis Submission Instructions
  - Master’s & Doctoral UMI Agreement Forms
  - Survey of Earned Doctorates
- **Degree Conferral**
  - Registrar’s Application for Degree
  - Petition for an Automatic Master’s
  - Graduation Checklists
- **Commencement**
Employment
Students receiving a stipend may accept employment only with the approval of their home academic department. Students working for more than 20 hours per week are not normally eligible for full-time status. See the ECE Graduate Program Administrator for details.

International students must obtain the appropriate work authorization from OISS before starting to work. If you work even one day before or after your authorization, you must leave the U.S. or face deportation. See oiss.rice.edu/studentwork/ for additional information.

Stipend/Summer Support
All enrolled full-time Ph.D. students are supported with full tuition and a stipend. All first-year Ph.D. students are supported by fellowships. Thereafter, students in good standing will be supported as Research Assistants by their M.S./Ph.D. advisors. Compensation is calculated and paid semi-monthly from August 16 to December 31 and from January 1 to May 15. Many Ph.D. students obtain fellowships in addition to what is provided by Rice. See graduate.rice.edu/funding for more information.

Summer Support - Students should discuss their summer plans well in advance with their advisors. In order to be paid by Rice for the summer, students must register for at least 6 hours of their advisor’s section of ELEC 800. Students planning a summer internship off-campus, with advisor’s approval, must inform the Lead Financial Analyst and Graduate Program Administrator by May 1 in order to complete the financial arrangements required.

Vacation/Time Off
Graduate students often receive financial support in the form of graduate stipend and tuition waivers. The termination of financial support to a graduate student, while not equivalent to dismissal, is a serious action that could deprive students of their financial ability to continue graduate studies.

Active participation in required academic activities (for example, laboratory work in certain science and engineering programs) is a basic condition for continued financial support. Students who are absent from such required activities for a contiguous two weeks without permission and without mitigating circumstances may be
subject to termination of financial support. Such absences may be taken as an indication that inadequate academic progress is being made. Thus, if absences have to occur, they must be pre-arranged with the student’s supervisor, except for medical and family emergencies, in which case timely notification is required. Graduate advisors and programs should be aware of unexplained student absences and must provide immediate written warnings when students are not present and carrying out required academic activities for more than one week. The nominal vacation periods are appropriate and must be discussed with the student’s graduate advisor.

**Departmental Responsibilities**

In most research degree programs, students must undertake a limited amount of teaching or perform other services as part of their training. Assigned duties should not entail more than 10 hours per week, averaged over the semester, or extend over more than eight semesters. ECE students are required to complete 6 semesters of grading as part of their training. Grader assignments are made at the beginning of each semester and responsibilities include grading coursework for the instructor and possibly delivering one or two lectures for practice and/or to fill in while the instructor is away on university business. Grading positions are required to fulfill these service obligations to the department and are unpaid.

A limited number of Teaching Assistant (TA) opportunities are available for PhD students with additional stipend supplement provided. Students should discuss these positions with the faculty member teaching the course and with their own thesis advisors prior to accepting the position. A mandatory TA training is provided by the Dean of Engineering’s office each fall and additional training opportunities are provide by the Center for Teaching Excellence. See the CTE website for additional information (bit.ly/1DqoE3V). For students interested in pursuing a career in academia after graduation, the TA program provides an excellent opportunity to practice developing and delivering instructions.

**Graduate Student Association**

The Graduate Student Association (GSA) is comprised of degree-seeking graduate students at Rice University. The GSA mission is to enrich the graduate student experience and to represent, support, and promote graduate student interests and values. Visit gsa.rice.edu to
learn more.

**ECE GSA**
The ECE GSA exists to augment the organizational, educational, professional, and social aspects of the graduate student experience. It serves as a connection to Rice’s overall GSA to voice larger concerns and gain supplementary support. Email pratiksha.d.dongare@rice.edu for details.

**Women ExCEL**
Women Excel is a network of women in the ECE Department at Rice University that aims to provide community, mentoring, and cultural enrichment for students. They furnish a medium for networking and discussion of women-specific issues. This network also serves to promote career opportunities and cultivate female leadership. In addition, they hope to improve the visibility of women in engineering and to advocate the importance of diversity in ECE. Learn more at excel.rice.edu.

### III. GENERAL ANNOUNCEMENTS

Rice University Publishes its “General Announcements” (GA) each year. These are the official rules of the university and include the honor code that every student agrees to abide by, as well as forms and research information. They can be found at ga.rice.edu. Two sections of this are of particular importance to graduate students in ECE. The first is the section titled “Graduate Degree Programs”. This outlines the basic rules and expectations for all graduate students at Rice University. The second, titled “Programs of Study,” is the department-specific information. This information covers the degree requirements for the M.S./Ph.D., and more information is found in section V. The ECE M.S./Ph.D. requirements from this section are reproduced below.

**Graduate Degree Program**
The Doctor of Philosophy (PhD) degree program prepares students for a research career in academia or industry. The PhD degree program consists of formal courses and original research conducted under the guidance of a faculty advisor, leading to a dissertation. Students in the PhD program complete a Master of Science (MS) degree as part of their program; the Electrical and Computer Engineering department does not admit students for a terminal MS degree.
Degree Requirements for PhD in Electrical Engineering
Students are admitted to the PhD program only in the fall semester. Electrical and Computer Engineering PhD students move through the program in stages, starting as first-year student, advancing to MS candidate, PhD-qualified student, and PhD candidate; each advancement requires the approval of the Electrical and Computer Engineering Graduate Committee. Students entering with previous graduate work may follow a hybrid program developed in consultation with the faculty and the Graduate Committee. The first academic year concentrates on foundation coursework and developing a research area. Each student must successfully complete a project, ELEC 599, in his or her chosen area of research in lieu of an oral or written qualifying exam. In addition to enabling the faculty to evaluate the student’s research potential, the project encourages timely completion of the MS degree. The student must complete a master’s thesis and successfully defend it in an oral examination. Students who have already acquired a master’s degree elsewhere must also complete the ELEC 599 project, after which acceptance of their previous master’s degree will be determined by the Graduate Committee. No course in which the student earned a grade lower than a B- may count toward an MS or PhD.

A candidate for the PhD degree must demonstrate independent, original research in Electrical and Computer Engineering. After successful completion of all coursework, a student is eligible for PhD candidacy. The student then engages in full-time research, culminating in presentation of the PhD research proposal and then the completion and public defense of the PhD dissertation. Details of the PhD program requirements, the phases of study, and a timetable may be found on the Electrical and Computer Engineering website.

Learning Outcomes
Upon completing the PhD degree program in Electrical and Computer Engineering, students will be able to:
1. Identify and define relevant research topics in Electrical and Computer Engineering and conduct independent research with results that advance the state of the art in the field.
2. Lead research and design groups by communicating innovative ideas effectively.
3. Solve real-world problems by integrating knowledge gained in courses and through independent study.
IV. M.S./PH.D. TIMELINE

Year 1
Your first semester at Rice will begin with Orientation Week (or O-Week) where you will learn about Rice and the Department of Electrical and Computer Engineering. The week will include presentations by many of the faculty you will become familiar with. You will meet your academic advisor, discuss your career objectives, and select your courses for your first semester.

The first academic year concentrates on foundation coursework followed by focus on a research area. The year consists of a minimum of 18 hours of coursework as follows. Any variance to this plan requires a written petition to and approval from the ECE Graduate Committee. See ece.rice.edu for more information.

Fall (1st semester):
By the end of the first week of class, the student must develop a M.S. course plan (see Section V – Degree Plan) approved by a member of the ECE Graduate Committee. It is then submitted to the Graduate Program Administrator for the student’s file. Course plans may be revised, re-approved and resubmitted at any time over the course of the degree program.
A minimum of 9 credit hours of core course-work is required.

Spring (2nd semester):
ELEC 599 (6 credit hours)
3 credit hours in core or breadth courses

ELEC 599 is a research presentation, developed under the guidance of a faculty advisor and committee that qualifies the student for continuation in the Ph.D. program. A spring midterm progress evaluation will be conducted with the advisor to ensure the student’s project is on track. More on ELEC 599 can be found in Section V – Ph.D. Qualifier.

Year 2 and Thesis Defense
The second year consists of research credits (ELEC 800) and the remaining core and breadth course credits.
Summer:
ELEC 800 (at least 6 credit hours)
Fall (3rd Semester):
6 credit hours in core or breadth courses
ELEC 800 and/or additional course credits

M.S. degrees are expected to be obtained by the end of the 4th semester (second year), and no later than the end of the 8th semester. Once the student has completed the requisite hours and established a committee, the student must submit the Petition for Approval of M.S. Candidacy to the Graduate Program Administrator. Once the student has performed research, written a thesis and is ready to defend, the student will schedule their oral presentations with their committees. See graduate.rice.edu/boundaries for time boundaries and graduate.rice.edu/candidacy for candidacy information.

Years 3-8
In year 3 and beyond, the student will perform his/her additional coursework and ELEC 800 totaling at least 30 hours for the M.S. and 90 for the Ph.D. All Rice graduate students must petition for Ph.D. candidacy before the start of the 9th semester (fifth year). Ph.D. degrees are expected to be obtained by the end of the 10th semester (fifth year) and no later than the end of the 16th semester (eighth year). See graduate.rice.edu/boundaries for time boundaries.

V. ACADEMICS

Master of Science (M.S.) Program
The M.S. degree is offered only as a precursor to the Ph.D. degree. It requires at least 30 graduate semester hours of study at the 500-level and above, beyond the bachelor’s degree (typically 24 hours of course credit which includes ELEC 599, and 6 hours of ELEC 800 research credit). Twenty-four of the 30 required hours must be completed at Rice; therefore, no more than 6 hours may be transferred from a previous M.S. degree in the case of a denied previous master’s degree. Your previous master’s degree will be denied if you switch subfields.

The M.S. program requires original research work reported in a thesis and a public oral presentation, evaluated by a master’s thesis committee consisting of a thesis advisor and at least two other faculty members. Barring a written exemption from the Graduate Committee, the M.S. must be completed within 3 years of entering the M.S./Ph.D. program.
Previous Master’s (Non-Rice)
Students admitted with a previous M.S. degree are required to complete a minimum 18 hours of course credit in addition to ELEC 599, and 48 hours of research credit. Previous M.S. degrees are approved or denied upon completion of ELEC 599 in the first year. Your previous master’s degree will be denied if you change subfields. Denied previous M.S. degrees require the student to obtain a Rice ECE M.S. degree before continuing on to the Ph.D. degree. Twenty-four of the 30 hours required for the M.S. must be completed at Rice; therefore, no more than 6 hours may be transferred from a previous M.S. degree in the case of a denied previous master’s degree. Visit ece.rice.edu for specifics.

Doctor of Philosophy (Ph.D.) Program
The Rice University Department of Electrical and Computer Engineering (ECE) offers a graduate program leading to the Doctor of Philosophy (Ph.D.). The Department does not offer a stand-alone thesis Master of Science degree; students admitted to our Ph.D. program with a bachelor’s degree are required to earn the M.S. within the program before proceeding to the Ph.D.

The Ph.D. program is full-time only, with a minimum of 9 credit hours per semester. Students must maintain continuous program involvement and enrollment unless granted an official leave of absence. It requires completion of at least 90 semester hours of graduate study and concluding an original investigation that is formalized in an approved thesis. As final evidence of preparation for this degree, the candidate must pass a public oral presentation and submit the approved thesis to the office of Graduate and Postdoctoral Studies. Each student is also required to complete 6 semesters of grading as part of their coursework and the seminar class, ELEC 699. See Section II, “Administration” under “Departmental Responsibilities” for more information. A 3.0 GPA (B) must be maintained in major and minor coursework. Only courses in which a grade of B- or above is achieved will be counted towards the M.S./Ph.D. degrees. Students whose GPA falls below a 2.33 will be placed on academic probation by the university. Students whose GPA falls below a 3.0 will be placed on academic probation by the ECE Department. Visit ga.rice.edu for more information from General Announcements.

Barring a written exemption from the Graduate Committee, the Ph.D
from B.S. must be completed within 6 years of entering the M.S./Ph.D.
program, and the Ph.D. from previous M.S. within 4 years.

**ELEC 699 Seminar**
The ELEC 699 Seminar Course is intended to foster development
of breadth among all graduates at all phases of study in ECE. The
requirement is registered attendance at 3 ECE sponsored or co-
sponsored seminars per semester. Additionally, each student is
required to attend and sign in for the following events: ECE Corporate
Affiliates Day, the Brice Distinguished Lecture, and the Chapman
Distinguished Lecture, in the years they are held. Exceptions must
be approved by the student’s advisor and the Department Chair.
Reasonable exceptions include travel for conference attendance,
internships, etc. Corporate Affiliates Day is scheduled for March 23,
2018, and attendance is required. All M.S./Ph.D. students are required
to take and earn an “S” (Satisfactory) in ELEC 699 as a part of his/
her degree requirements for each semester in residence. Details of
seminars are emailed on a regular-basis and are posted on the ECE
website at ece.rice.edu. Seminars hosted or co-hosted by a student’s
thesis advisor cannot be counted towards the student’s 3 seminars.
Departmental attendance sheets will be provided at all seminars for
the first 10 minutes. It is your responsibility to sign-in at the beginning
of the seminar. If for some reason there is no sign-in sheet available,
students will be responsible for emailing the Graduate Program
Administrator within 24 hours of attendance in order to receive credit.

**Ph.D. Qualifier – ELEC 599**
ELEC 599 serves two purposes: It allows students to begin research
early in the Ph.D. program. Projects selected often serve as catalysts
for publications and thesis work. It serves as the ECE Ph.D. qualifier by
demonstrating one’s ability to perform independent research.

Students must pass ELEC 599 to remain in the Ph.D. program (a
passing grade for ELEC 599 is indicated by a grade of A- or higher). At
the end of the fall semester of the first year, students select a research
project. It is the student’s responsibility to meet with faculty in the first
semester and secure an advisor for 599.

ELEC 599 requirements consist of two parts:
1. Research, which is self-scheduled, with regular meetings with the
student’s advisor.
2. Communications Seminars, which are 1.5 hours weekly. Early in the spring semester students submit project abstracts and timelines, followed by the selection of two project committee members in addition to the advisor. At least two committee members must have their primary appointment in ECE as assistant, associate, or full professors. Other committee members may be adjunct faculty selected from ECE as well as faculty from ECE-related interdisciplinary departments. A spring midterm progress evaluation will be conducted with the advisor to ensure the student’s project is on track. Any problems will be referred to the ECE Graduate Committee for intervention.

In April, the ECE Graduate Program Administrator will schedule oral presentations for all ELEC 599 students. Presentations are limited to 20 minutes with a maximum of 20 slides, and questions by committee are limited to 5 minutes. The written project reports must be submitted to committees and the ECE Graduate Program Administrator by mid-April. Reports are limited to 10 pages and should be formatted in 11 pt. font and according to the LaTeX or MS Word templates given in the IEEE transaction style. Visit bit.ly/1qg7vC0 for guidelines.

It is the student’s responsibility to follow up with all committee members prior to the scheduled presentation to confirm all logistics of the ELEC 599 qualifier. Following presentations, project committees will meet to provide written evaluations, which are then submitted to the ECE Graduate Committee for final evaluation and grade.

The ELEC 599 grade is based on:
1. Overall performance on the project;
2. Motivation and enthusiasm for graduate work;
3. Quality of written presentation;
4. Quality of oral presentation;
5. Quality of research; and

Visit ece.rice.edu for specifics. The grading rubric can also be found there.

The Graduate Committee meets to determine final ELEC 599 grades, after which individual evaluation letters will be provided to students. At this meeting, the Committee will also determine whether or not
previous Master’s degrees will be accepted, which will also be noted in evaluation letters.

Students who do not pass ELEC 599 will not be permitted to continue in the M.S/Ph.D. program and financial support will end on May 15. However, graduate student status may be retained without financial support until August 15.

**Academic and Research Advisors**

Each incoming Ph.D. student is initially assigned an academic advisor, usually a member of the ECE Graduate Committee, to help with course selection and other initial academic concerns. Final course selection does not need to be completed until after the start of classes. During the first year, Ph.D. students will be responsible for meeting faculty to select a research advisor, who will then take over the student’s advising. Usually the research advisor will be derived from the ELEC 599 research project undertaken in the second semester of the program. Upon passing ELEC 599 at the end of the first year, the advisor will begin providing stipend support for the graduate student. A few students in the ECE Ph.D. program have a thesis director/research advisor whose primary appointment is not in the ECE department. In such cases, the student’s program will still be governed by the program requirements of the ECE department as listed in this handbook and on the ECE website, and in accordance with the guidelines of the Rice University General Announcements.

**Annual Review**

All M.S./Ph.D. students in ECE complete an annual review in conjunction with their thesis advisors. The purpose of this review is to:

1) Evaluate progress towards the degree;
2) Communicate your objectives for the coming year to your advisor; and
3) Ensure a shared set of expectations between student and advisor as to what defines satisfactory progress for the coming year.

Each M.S./Ph.D. student will be asked to complete a self-evaluation each April and discuss the year’s progress with the advisor. Following this review conversation, it is the student’s responsibility to ensure that the annual review is submitted to the Graduate Program Administrator. Students who do not complete the annual review may not be considered in good academic standing.
If a student has not met the goals from the previous year and/or is not demonstrating satisfactory progress toward the degree, the academic advisor will prepare a written plan, including goals and deadlines, that includes clearly stated consequences of not meeting the goals. A copy of the plan will be placed in the student’s academic file.

**Candidacy and Defense**

**M.S. Course Plan**
By the end of the first week of class, the student must develop a M.S. course plan (see Section V – Degree Plan) approved by a member of the ECE Graduate Committee. It is then submitted to the Graduate Program Administrator for the student’s file. Course plans may be revised, re-approved and resubmitted at any time over the course of the degree program.

**M.S. Candidacy**
The Petition for Approval of M.S. Candidacy form is submitted to the ECE Graduate Program Administrator along with a copy of his/her final actualized course plan. The Department Chair’s signature is required on the petition, which is then submitted along with the transcript and course plan to the Office of Graduate and Postdoctoral Studies (GPS) for approval. See [graduate.rice.edu/candidacy](http://graduate.rice.edu/candidacy) for more information.

**M.S. Defense**
One week prior to defending, the student must submit the following information to GPS, the Rice Events Calendar ([events.rice.edu/rgs](http://events.rice.edu/rgs)), and to the ECE Graduate Program Administrator to publish to the department listservs: defense date, time, location, title and abstract, as well as the names, titles and departments of committee members. See [graduate.rice.edu/thesis](http://graduate.rice.edu/thesis) for more information.

The M.S. student receives an initialed Approval of Candidacy form from GPS, which is signed by members of the student’s committee upon passing the M.S. defense. Within a week after the final oral examination in defense of thesis is passed, the student must upload to [thesis.rice.edu](http://thesis.rice.edu) a pdf copy of the thesis and a scan of the Approval of Candidacy form, signed (and dated) by the thesis committee. The student has six months from the date of defense to submit his/her signed thesis to GPS, at which time the student becomes a Master’s Degree Candidate.
In addition to the documents required by the Graduate Office (candidacy form and copies of thesis coversheets), the students should see the ECE Graduate Program Administrator for defense evaluations to be completed by each member of the committee at the presentation. Defense evaluations should be returned to the Graduate Program Administrator immediately following the defense. Visit ece.rice.edu for guidelines.

Additionally, if a student plans to defend and submit a thesis for the next degree conferral, students must file their applications for approval of M.S. candidacy with GPS before November 1 for mid-year conferral and before March 1 for May conferral. In addition, the defense must be completed and the thesis submitted prior to the deadline found on the registrar’s calendar.

Ph.D. Course Plan
In the semester following successful M.S. defense, the student must develop a Ph.D. course plan (see Section V – Degree Plan) approved by a member of the ECE Graduate Committee. It is then submitted to the Graduate Program Administrator for the student’s file. Course plans may be revised, re-approved and resubmitted at any time over the course of the degree program.

Ph.D. Candidacy
In order to petition for Ph.D. degree candidacy, a student must have completed 45 semester hours of advanced studies as described on the course plan and approved by the Department, achieved a grade of B- or above in each of these courses, successfully completed ELEC 599, and earned a Master of Science degree from Rice University, or have an equivalent Master of Science degree, as decided by the ECE Graduate Committee. See graduate.rice.edu/candidacy for more information.

The Petition for Approval of Ph.D. Candidacy form is then submitted to the ECE Graduate Program Administrator along with a current transcript and a copy of his/her course plan before the start of the 9th semester (fifth year). The Department Chair’s signature is required on the petition, which is then submitted along with the transcript and course plan to GPS for approval.

Ph.D. Thesis Proposal
After a student petitions for candidacy, but before defending his/her thesis, the student must present a thesis proposal. This is done after
A research direction has been decided upon and after preliminary results are achieved, but with enough time remaining to include any redirections recommended by committee members. This usually occurs over 1 year before the Ph.D. Defense and is an oral presentation to the thesis committee, no written proposal is required. The ECE Graduate Program Administrator will generate a form letter for the student’s committee members to sign in approval of the thesis proposal following the presentation. The student may only defend his/her thesis after successfully presenting the thesis proposal and upon approval of the committee members.

One week prior to presentation of thesis proposal, the student must submit the following information to the ECE Graduate Program Administrator to publish to the department listservs: proposal date, time, location, title and abstract, as well as the names, titles and departments of committee members.

**Ph.D. Defense**

Two weeks prior to defending, the student must submit the following information to GPS, the Rice Events Calendar (events.rice.edu/rgs), and to the ECE Graduate Program Administrator to publish to the department listservs: defense date, time, location, title and abstract, as well as the names, titles and departments of committee members. Visit graduate.rice.edu/thesis for more information.

The Ph.D. student then receives an initialed Approval of Candidacy form that is signed by the student’s committee members upon passing the Ph.D. defense. Within a week after the final oral examination in defense of thesis is passed, the student must upload to thesis.rice.edu a pdf copy of the thesis and a scan of the Approval of Candidacy form, signed (and dated) by the thesis committee. The student has 6 months to submit a signed thesis to GPS, at which time the student becomes a Doctoral Degree Candidate.

In addition to the documents required by the Graduate Office (candidacy form and copies of thesis coversheets), the students should see the ECE Graduate Program Administrator for defense evaluations to be completed by each member of the committee at the presentation. Defense evaluations should be returned to the Graduate Program Administrator immediately following the defense.
Additionally, if a student plans to defend and submit a thesis for the next degree conferral, students must file their applications for approval of Ph.D. candidacy in the Office of Graduate and Postdoctoral Studies before November 1 for mid-year conferral and before March 1 for May conferral. In addition, the defense must be completed and the thesis submitted prior to the deadline found on the registrar’s calendar.

Grievances and Problem Resolution
The basic path for problem resolution within the department is to consult with the Chair of Graduate Studies followed by the Department Chair. If no resolution can be found at this level, the process from the general announcements found at [bit.ly/1Mbc1wp](http://bit.ly/1Mbc1wp) will be followed.

Changes in Research Group, Program or Department
Rice recognizes research interests may change after a student enters a graduate program. If a student feels his/her interests and talents could be better served working with a different advisor or in another research group or department, a change can be accommodated. Although each case is unique, following are guidelines for making an advisor/group/department change:

1. Discuss issues with current advisor. Often an adjustment of research topic may resolve the problem.
2. If issues are insurmountable, speak with faculty members whose research interests are more in line with the student’s and who have the funding for support.
3. When an alternate faculty member agrees to replace the current advisor, obtain permission from the Chair of ECE Graduate Committee and proceed to the ECE Graduate Program Administrator, who will process the documentation required for the exchange to be used towards earning the MEE degree.
4. Only three credits of ELEC 599 may be transferred to apply towards the MEE degree.
5. An M.S./Ph.D. student who transfers to the MEE program will be responsible for reimbursing the cost of tuition for courses.

ECE Areas of Study
The ECE Department has five interdisciplinary areas of study that the M.S./Ph.D. student can choose from:
**Computer Engineering:**
The Computer Engineering group at Rice University has a long track record of innovative research in physical modeling and characterization, VLSI signal processing, computer architecture, computer-aided design, and storage and network systems. Spanning the spectrum of computing from low-power personal devices to large-scale parallel information systems, networked computing solves a myriad of technology challenges. Future computing technologies include the on-chip integration of systems and networks.

**Data Science:**
Data scientists seek to collect and understand the structure in data, looking for compelling patterns, telling the story that is buried in the data. They get at the questions at the heart of complex problems and devise creative approaches to making progress in a wide variety of application domains. This is an emerging discipline that integrates: tools and techniques involving data acquisition; data analytics and data storage; and computing infrastructure in order to enable extraction of meaningful information from massive data sources.

**Neuroengineering:**
The brain is essentially a circuit. Neuroengineering is a discipline that exploits engineering techniques to understand, repair and manipulate human neural systems and networks. At Rice, we develop technologies to understand, repair, replace, enhance, or treat the diseases of the nervous system. We also design, construct and study devices that interface with living neural tissue. Rice is uniquely positioned as a leader in the field thanks to the broad, interdisciplinary research performed in conjunction with the world’s largest medical center (Texas Medical Center), steps away from the Rice University campus.

**Photonics, Electronics and Nano-devices (PEN):**
The focus of this program is the improved understanding of electronic, photonic, and plasmonic materials, optical physics, the interaction of light and matter, along with the application of that knowledge to develop innovative devices and technologies. The specific areas of interest cover a broad range, including: nanophotonics and plasmonics; studies of nanomaterials and magnetically active materials; imaging and image processing, including multispectral imaging and terahertz imaging; ultrafast spectroscopy and dynamics; laser applications in remote and point sensing; single-molecule
transistors; and applications of Nanoshells in biomedicine.

**Systems:**
Rice is a leader in Digital Signal Processing. Signal Processing is the analysis and transformation of signals in order to understand, simplify, or recast their structure. The understanding of how to analyze and restructure signals is applied to a wide range of areas, including: image and video analysis; computational neuroscience; statistical signal processing, pattern recognition, and learning theory; communication systems; and high-performance, scalable wireless internet.

**Degree Plan**
Coursework is based on the student’s degree plan. The degree plan requirements for the M.S. portion of the program must include:
At least 30 credit hours beyond the B.S., including 18 hours of core and breadth courses (6 courses), 6 hours of research credit (ELEC 800), and 6 hours of ELEC 599, the Ph.D. qualifier. ELEC 699 is required for each semester in residence.

The degree plan requirements for the Ph.D. portion of the program must include 60 hours of credit beyond the Rice M.S., including 12 additional course credits (4 courses). The remaining credits can include research credits, seminars, or other courses. ELEC 699 is required for each semester in residence.

Students may be eligible to transfer up to 6 hours of credit from another university, 24 of the 30 hours required for the M.S. must be completed at Rice; therefore, no more than 6 hours may be transferred from a previous M.S. degree in the case of a denied previous master’s degree. Rice undergraduates entering the M.S./Ph.D. program may transfer course credit not applied to their undergraduate degrees, with the approval of the ECE Graduate Committee and Office of the Registrar.

**ESTHER**
Students must register for courses using ESTHER. ESTHER is the web application for students, faculty and staff. Students will use this application to register for classes and retrieve certain data such as grades and account information. For information about how to use ESTHER see section II or: registrar.rice.edu/students/esther_FAQs/
Guidelines for Independent Study
ELEC 591 - Vertically Integrated Projects at Rice University (VIP)
The Vertically Integrated Projects (VIP) Program at Rice unites graduate and undergraduate education and faculty research in a team-based context. Undergraduate Rice VIP students earn academic credits, while faculty and graduate students benefit from the design/discovery efforts of their teams. Students interested in VIP projects should meet and consult with the faculty lead of that project. Visit vip.rice.edu for more information.

Grades, Department Duties, Academic Status

Grades—According to university guidelines, students must achieve at least a B- (2.67) grade point average (GPA) in courses counted toward the graduate degree. The ECE Department requires a B (3.0) GPA and adds the requirement that only courses in which a grade of B- or above is earned will count towards the graduate degree. Students whose cumulative GPA falls below a 2.67, or whose semester GPA falls below a 2.33, will be placed on academic probation by the university. Students whose GPA falls below a 3.0 will be placed on academic probation by the ECE Department. The period of probation extends to the end of the next semester in which the student is enrolled. If that probationary semester results in a cumulative GPA below 3.0 or a semester GPA below 2.33, the student will immediately be dismissed without further warning. To compute GPA, the credits attempted in semester hours for each course and the points for the grade earned (from A+ = 4.33 to F = 0.00) are multiplied, then the products (one for each course) are added together, and the sum is divided by the total credits attempted.

Pass/Fail—No courses counted towards the degree plan may be taken pass/fail.

Satisfactory/Unsatisfactory—Satisfactory/unsatisfactory courses are those that do not use traditional grading procedures and instead assign a grade assign a grade of “S” or “U”. ELEC 800, Research and Thesis, is such a course. Students should be aware that while a grade of “S” or “U” does not affect their GPA, no credit is awarded if a grade of “U” is received. Courses with a grade of “S” will count towards total credits earned.

Incomplete (INC)—Instructors report this designation to the Office of the Registrar when a student fails to complete a course because of verified illness or other circumstances beyond the student’s control that occur during the semester. For an INC received in the fall semester,
students must complete the work by the end of the first week of the spring semester or an earlier date as defined by the instructor, and instructors must submit a revised grade by the end of the second week. For an INC received in the spring or summer semester, students must complete the work before the start of the fall semester or an earlier date as defined by the instructor, and instructors must submit a revised grade by the end of the first week. If a grade is not submitted by the appropriate deadline, the INC will be automatically converted to a failing grade.

Audit (AUD)—Students have the option of auditing courses. For auditing students, instructors report either the AUD or the NC (no credit) grade symbol, the AUD if the student met the audit requirements of the class, or the NC if they have not. There are no credit hours associated with audited courses, and auditing a course does not affect a student’s GPA. Request to audit a class or to change from audit to credit or vice versa must be done by the end of the second week of the semester.

VI. IMPORTANT LINKS AND DATES

Links
Academic Calendar: registrar.rice.edu
Award Opportunities: engineering.rice.edu/gradopps
Counseling Center: wellbeing.rice.edu/rice-counseling-center
Course Catalog: courses.rice.edu
Forms: registrar.rice.edu/online_forms graduate.rice.edu/forms
General Announcements: ga.rice.edu
Good Practices in Graduate Education: graduate.rice.edu/goodpractices
Graduate and Postdoctoral Studies (GPS) Office: graduate.rice.edu
Guidelines for Dismissal/Petition: bit.ly/RUdismiss
Honor System and Code of Student Conduct:
ga.rice.edu
International Student Information: oiss.rice.edu
International Student Forms: oiss.rice.edu/forms/
Library: library.rice.edu
Map of Campus: rice.edu/maps
Parking: parking.rice.edu
Recreation Center: recreation.rice.edu
Registration: graduate.rice.edu/registration
Research and Scholarly Activities: ga.rice.edu/GR_students/
Technology Support: ece.rice.edu
Wellness: wellbeing.rice.edu

Dates
Refer to the Registrar’s Office at registrar.rice.edu for all academic calendar information.

Help Available
When you or a friend is in need of help, there are many resources available to you on the Rice campus:

Graduate Program Chair & Administrator
Dr. Behnaam Aazhang & Graduate Program Administrator Angel Forward are available to help students with academic and personal needs. Their contact information can be found in Section VII.

Language and Communications: cwovc.rice.edu
The Center for Written, Oral and Visual Communication is located in the Fondren Library. They offer coaching for oral presentation delivery, assistance with preparing professional talks and materials, communication workshops and feedback on presentation materials. They also offer UNIV 601/602, which are courses designed to improve professional communications and writing.
Fondren Library Resources: library.rice.edu
The library offers subject area specialists to assist students and act as liaisons to departments. There is a specialist for Electrical Engineering and also for the English language. They can answer reference questions, teach you how to use various electronic media, advise students on how to identify materials relevant to teaching and research, and prepare a printed or electronic library guide. The library guide for English as a Second Language (ESL) students can be found at bit.ly/eslrice1.

ENGI 600: rcel.rice.edu/engi600
ENGI 600 is a course for any graduate student in engineering who is actively writing: a paper for publication; master’s thesis; Ph.D. dissertation; or an extended Ph.D. proposal. In the weekly 1.5 hour seminars, the class will teach you how to communicate more clearly and persuasively, whether you are a native speaker or an international student. The course will help you finish your writing more quickly. Class size is limited, visit the website for more information.

Student Health Services: health.rice.edu
The Rice Student Health Services provides preventive and outpatient clinical care for the students of Rice University. Student Health is located on-campus and is dedicated to meeting the unique needs of undergraduate and graduate students.

Student Wellbeing Office: wellbeing.rice.edu
The Student Wellbeing Office supports student development and success and is also a good first point of contact for students who want to talk to someone about solutions to their wellbeing concerns. They can provide advice and practical support to help you resolve personal challenges, such as conflicts with friends, difficulty making decisions, struggling with your identity, and academic concerns or problems that are more serious in nature.

Rice Counseling Center: wellbeing.rice.edu/rice-counseling-center
The Rice Counseling Center is designed to complement the university’s academic mission by assisting students’ personal and educational development through a variety of psychological and psychiatric services. The goal of these efforts is to help students develop effective problem-solving and decision-making capabilities in order to make
satisfying life choices, and maximize their capacity for continued emotional growth.

**Graduate and Postdoctoral Studies (GPS) office:** [gps.rice.edu](http://gps.rice.edu)
For questions concerning the graduate program as a whole, contact Sherry Vanderslice, Graduate Student Affairs Project Manager, at sdvl@rice.edu or 713-348-2154.

**Title IX Information:** [safe.rice.edu](http://safe.rice.edu)
Rice encourages any student who has experienced an incident of sexual, relationship, or other interpersonal violence, harassment or gender discrimination to seek support. There are many options available both on and off campus for all graduate students, regardless of whether the perpetrator was a fellow student, a staff or faculty member, or someone not affiliated with the university.

Students should be aware when seeking support on campus that most employees are required by Title IX to disclose all incidents of non-consensual interpersonal behaviors to Title IX professionals on campus who can act to support that student and meet their needs. The therapists at the Rice Counseling Center and the doctors at Student Health Services are confidential, meaning that Rice will not be informed about the incident if a student discloses to one of these Rice staff members. Rice prioritizes student privacy and safety, and only shares disclosed information on a need-to-know basis.

If you are in need of assistance or simply would like to talk to someone, please call Rice Wellbeing and Counseling Center, which includes Title IX Support: 3311/(713) 348-3311. Policies, including Sexual Misconduct Policy and Student Code of Conduct, and more information regarding Title IX can be found at [safe.rice.edu](http://safe.rice.edu).
STAFF DIRECTORY

Angel Forward  
Graduate Program Administrator  
713-348-3342  
forward@rice.edu  
Abercrombie A225

Trey Menchaca  
Staff Assistant  
713-348-4020  
am22@rice.edu  
Abercrombie A204

Carrie Toffoletto  
Executive Administrator  
713-348-5081  
cöff@rice.edu  
Abercrombie A204

Jennifer Hunter  
Visibility Specialist  
713-348-4212  
jkh6@rice.edu  
Abercrombie A203

Additional information such as a full listing of all staff and their responsibilities can be found at ece.rice.edu
FACULTY DIRECTORY

Behnaam Aazhang*, J.S. Abercrombie Professor, Electrical and Computer Engineering  
aza@rice.edu  
Research areas: Data Science; Neuroengineering; Systems  
Dr. Aazhang researches neural circuits in the hopes of mitigating disorders such as epilepsy, parkinson, depression and obesity. Other areas of study include communication and information theory.

Athanasios C. Antoulas, Professor, Electrical and Computer Engineering  
aca@rice.edu  
Research areas: Computer Engineering; Systems  
Dr. Antoulas is interested in large-scale dynamical systems, approximation, computation, and linear algebra.

Aydin Babakhani, Associate Professor, Electrical and Computer Engineering  
ab28@rice.edu  
Research areas: Computer Engineering; Neuroengineering; Systems  
Dr. Babakhani’s research focuses on integrated sensors and systems and his work impacts high-speed wireless, radar, medical imaging, security, biosensing, and oil/gas monitoring.

Richard G. Baraniuk, Victor E. Cameron Professor of Electrical and Computer Engineering  
richb@rice.edu  
Research areas: Data Science; Neuroengineering; Systems  
Dr. Baraniuk is the founder of OpenStax, providing free college textbooks! He is interested in multiscale, computational signal and image processing and open access, collaborative scholarly publication.

Palash Bharadwaj, Assistant Professor, Electrical and Computer Engineering  
palash.bharadwaj@rice.edu  
Research areas: Photonics, Electronics & Nanodevices  
Dr. Bharadwaj is interested in light-matter interaction at the nanoscale, optical antennas, nanoscale energy transduction, plasmonics, spectroscopy and microscopy, and optoelectronics.

Joseph R. Cavallaro*, Professor, Electrical and Computer Engineering & Computer Science  
cavallar@rice.edu  
Research areas: Computer Engineering; Systems  
Dr. Cavallaro’s research impacts the development of the next generation of cellular mobile phones. He studies Wireless Communication Systems Architectures, VLSI Systems Design and Prototyping. REU opportunities available.

ECE is Epilepsy Research  
Epilepsy is the 4th most common neurological disease in United States, and many patients don’t respond well to traditional treatment like drugs. The Aazhang group is working to predict the onset of seizure.

*Denotes VIP Faculty
Gene Frantz, Professor in the Practice, Electrical & Computer Engineering (Signal Processing)
genef@rice.edu
Research areas: Systems
Gene Frantz is interested in entrepreneurship and intrepreneurship. He is an expert in Digital Signal Processing.

Fabrizio Gabbiani, Professor, Electrical & Computer Engineering
Professor of Neuroscience, Baylor College of Medicine
gabbiani@bcm.edu
Research areas: Neuroengineering
Dr. Gabbiani is interested in computational aspects of sensory information processing from the single cell to the network level.

Naomi J. Halas, Stanley C. Moore Professor, Electrical & Computer Engineering
Professor of Biomedical Engineering, Chemistry, Physics and Astronomy
halas@rice.edu
Research areas: Photonics, Electronics & Nanodevices
Dr. Halas’ group harvests solar radiation for energy applications and researches nanoparticle use in cancer therapy. She designs and fabricates optically responsive nano structures, nanophotonics, and plasmonics.

Reinhard Heckel, Assistant Professor, Electrical and Computer Engineering
(Anticipated Fall 2017 - check ece.rice.edu)
Research areas: Data Science; Systems
Dr. Heckel is interested in signal processing, statistics, and machine learning with a focus on developing algorithms and theory for space signal recovery, clustering of high-dimensional statistics, and convex optimization.

ECE is Solar Desalination
Rice’s Center for Nanotechnology Enabled Water Treatment (NEWT) has developed an off-grid technology that uses energy from sunlight alone to turn salt water into fresh drinking water.

ECE Professor Naomi Halas leads NEWT’s nanophotonics research efforts.
Edward W. Knightly, Chair, Electrical and Computer Engineering, Lindsay-Sheafor Professor, Electrical and Computer Engineering, Professor, Computer Science
knightly@rice.edu
Research areas: Systems
Dr. Knightly is the founder of Technology for All, bringing tech to underserved areas. He is interested in wireless networks, urban-scale testbeds, clean-slate design, diverse spectrum access, multi-antenna systems, hardware platforms, high-performance protocol design, security, & performance evaluation. REU opportunities available.

Junichiro Kono, Professor, Electrical and Computer Engineering, Physics & Astronomy
kono@rice.edu
Research areas: Photonics, Electronics & Nanodevices
Dr. Kono’s research results in increased understanding of quantum states. He’s interested in condensed matter physics, optics and photonics, nanoscience and nanotechnology. REU opportunities available.

Caleb Kemere, Assistant Professor, Electrical and Computer Engineering***
caleb.kemere@rice.edu
Research areas: Neuroengineering
Dr. Kemere is researching memory manipulation for the greater good (treating PTSD) and Deep Brain Stimulation for treatment of diseases like Parkinson. He is interested in building interfaces with memory and cognitive processes; model-based signal processing; and low-power embedded systems.

Kevin Kelly, Associate Professor, Electrical and Computer Engineering**
kelly@rice.edu
Research areas: Photonics, Electronics & Nanodevices
Dr. Kelly is interested in imaging and spectroscopy at the nanoscale, and understanding the role of mathematics in image acquisition and interpretation. Other interests include Scanning Probe Microscopy, Electronic Materials, Compressive Infrared and Hyperspectral Imaging.

Yingyan Lin, Texas Instruments Visiting Assistant Professor, Electrical & Computer Engineering (anticipated Fall 2017 - check ece.rice.edu)
Research areas: Computer Engineering; Data Science
Dr. Lin’s research interests include analog and mixed-signal circuits, error resiliency techniques, and VLSI circuits and architectures for machine learning systems on resource-constrained platforms.

**Sabbatical Spring 2018 / ***Sabbatical Fall 2017
ECE is Research in Education

The Baraniuk lab researches how the brain perceives depth and 3D vision. They are interested in machine learning and image and neural information processing.

Gururaj Naik, Assistant Professor, Electrical & Computer Engineering
guru@rice.edu
Research areas: Photonics, Electronics & Nanodevices
Dr. Naik is interested in light and heat management for clean energy: thermovoltaics and photovoltaics; materials for plasmonics and metamaterials; and large-area nanofabrication and integration. REU opportunities available.

Michael T. Orchard, Professor, Electrical & Computer Engineering
orchard@rice.edu
Research areas: Data Science; Systems
Dr. Orchard researches image and video modeling and compression.

Ankit Patel, Assistant Professor, Electrical & Computer Engineering
Assistant Professor, Neuroscience, Baylor College of Medicine
abp4@rice.edu
Research areas: Data Science; Neuroengineering; Systems
Dr. Patel is interested in probabilistic theories of Deep Learning from first principles; neurally-inspired learning and computation; medical imaging diagnosis; reverse-engineering neocortex; and Deep Learning for particle physics.

ECE is ‘Upconverted’ Light

Guru Naik’s method to ‘upconvert’ light could make solar cells more efficient and disease-targeting nanoparticles more effective.
Xaq Pitkow, Assistant Professor, Electrical and Computer Engineering  
Assistant Professor, Computational Neuroscience, Baylor College of Medicine  
xaq.pitkow@rice.edu  
Research areas: Data Science; Neuroengineering  
Dr. Pitkow’s research includes theories of neural computation in animal brains. Topics include: probabilistic inference, control theory, nonlinear dynamics, population codes. Current projects include analyzing behaviors of animals playing video games; designing animal virtual reality environments; stimulating and analyzing computation in neural networks.

Ashutosh Sabharwal*, Professor, Electrical and Computer Engineering  
ashu@rice.edu  
Research areas: Data Science; Photonics, Electronics & Nanodevices  
Dr. Sabharwal is interested in mobile health - using smart devices to diagnose and treat patients in more scenarios, to measure medicine adherence, and to impact health behaviors. He’s also interested in wireless networks, information theory, multiple antenna systems, coding and computation.  
REU opportunities available.

Akane Sano, Assistant Professor, Electrical and Computer Engineering  
(Anticipated July 1, 2018 - check ece.rice.edu)  
Research areas: Data Science; Systems  
Dr. Sano is interested in affective computing, particularly mobile and personalized health. Currently, she is lead investigator on the SNAPSHOT study measuring sleep, stress, and ambulation in everyday living.

Harel Shouval, Professor, Electrical and Computer Engineering  
Professor, Neuroscience, UT Health  
harel.shouval@uth.tmc.edu  
Research areas: Neuroengineering  
Dr. Shouval is interested in forming an integrated picture of learning, memory and development, processes that share many common mechanisms.

*Denotes VIP Faculty

ECE is Mobile Health
In partnership with IBM, ECE researchers have developed a prototype Multi-Purpose Eldercare Robot Assistant (MERA). The Watson-enabled robot is designed to help assist the elderly and their caregivers in an “aging in place” environment.
ECE is Lensless Cameras

ECE Researchers have developed a flexible, lensless camera, smaller than a dime. It’s called “FlatCam”.

Ray Simar*, Professor in the Practice, Electrical and Computer Engineering (Digital Signal Processing Architecture)
ray.simar@rice.edu
Research areas: Systems
Dr. Simar’s team has built a putter that gives active feedback to golfers. They’re now working on a self-driving motorcycle. His research includes digital signal processors, design methodology and programming tools.

Isabell Thomann, Assistant Professor, Electrical and Computer Engineering
it6@rice.edu
Research areas: Photonics, Electronics & Nanodevices
Dr. Thomann creates novel materials and nanostructures to solve practical problems in the areas of energy and photocatalysis. She is interested in interdisciplinary problems in energy, photocatalysis, ultrafast spectroscopy and nanophotonics.

Frank K. Tittel, J.S. Abercrombie Professor, Electrical and Computer Engineering, Professor, Bioengineering
fkt@rice.edu
Research areas: Photonics, Electronics & Nanodevices
Dr. Tittel’s research includes developing sensor technology for the oil & gas industry. He is interested in quantum electronic devices, laser spectroscopy with applications in environmental monitoring, atmospheric chemistry, industrial process analysis and control, medical diagnostics based on breath analysis, the life sciences, defense applications and homeland security.

Peter J. Varman, Professor, Electrical and Computer Engineering & Computer Science
pjv@rice.edu
Research areas: Computer Engineering; Data Science
Dr. Varman researches computer systems, storage and memory systems, virtualization and resource management, and cloud computing. REU opportunities available.

Ashok Veeraraghavan, Associate Professor, Electrical and Computer Engineering
vashok@rice.edu
Research areas: Data Science; Neuroengineering; Systems
In addition to his recent development of a lensless camera, Dr. Veeraraghavan has a strong interest in mobile health and using smart devices to diagnose and treat patients. He is interested in computational imaging, compressive sensing for imaging, signal processing and computer vision.
Gary Woods*, Professor in the Practice, Electrical and Computer Engineering (Computer Technology)
gary.woods@rice.edu
Research areas: Photonics, Electronics & Nanodevices
Dr. Woods is interested in mobile health, semiconductor failure analysis, and optical probing and debugging of advanced integrated circuits. He has advised groups who’ve gone on to: develop a vest to help the deaf hear; develop a dynamic radar and digital imaging system; and create an automated monitoring and control system for water waste reduction in oil fields.

Kaiyuan Yang, Assistant Professor, Electrical and Computer Engineering
kyang@rice.edu
Research areas: Computer Engineering
Dr. Yang’s research focuses on designing low-power digital and mixed-signal circuits for future secure and low-power applications, especially the Internet of Things (IoT). He is also interested in hardware security and circuit/system design with emerging devices.

Lin Zhong, Professor, Electrical and Computer Engineering
lzhong@rice.edu
Research areas: Computer Engineering; Data Science
Dr. Zhong’s team recently developed RIO, which allows an application on one mobile system to utilize I/O from another. He’s interested in mobile and embedded systems, human-computer interaction, and nanoelectronics. REU opportunities available.

ECE is RockStar Faculty (really).
Lin Zhong is an actual ECE RockStar - he won the 2014 SIGMOBILE RockStar Award. His group recently developed RIO - a system solution for sharing I/O between multiple mobile devices.