Realizing future solutions... today

NANOENGINEERING DEGREE PROGRAM
www.nanoengineering.ucsd.edu
Professor Tod A Pascal (tpascal@ucsd.edu)
Department of NanoEngineering – Overview

- Founded in 2007 (First department dedicated to Nanoscience and Engineering in the US!)
- Currently 30 world class faculty performing groundbreaking research in 4 unique areas
- Offers B.S., M.S. and Ph. D. degrees
- Accredited by the Engineering Accreditation Commission of ABET
- Houses the Chemical Engineering program (stick around for presentation by Prof. Drew!)
Department of NanoEngineering – Overview

- Nanoengineers (that will be you!) control materials and processes on the scale of 1-100 nm.

Water molecule ~0.3 nm
DNA ~2 nm
Transistor ~10 nm
SARS-CoV-2 Virus ~100 nm
You will learn why things behave differently at the nanoscale than in our macroscopic world.

Chitin in a butterfly wing is structured at nanoscale to form a photonic crystal.
Department of NanoEngineering – Overview

You will be trained at the cutting-edge to create new inventions that disrupt and change the way we approach technology.

New solutions to Grand Challenges
You will learn about and be trained to use specialized tools to “see” at the nanoscale.
Nanoengineering is highly interdisciplinary.

- **Electronics** - Flexible, wearable, miniaturized devices.
- **Cancer nanotechnology** - radially changing how we diagnose and treat cancer.
- **Renewable energy** - Enabling more efficient ways of transforming and storing energy.
- **Big Data Science**
- **Computer Simulations & Theory**
Department of NanoEngineering – B.S. Program

A degree in Nanoengineering gives you a jumpstart in training.

Math

Physics

Chemistry

Biology

NanoE Core
- Materials
- Synthesis
- Fabrication
- Characterization
- Modeling/Theory
- Design
A degree in Nanoengineering gives you a jumpstart in your career.
The NANO curriculum will teach you a different engineering skillset than other majors.

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>• Engineering Prep</th>
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<tbody>
<tr>
<td>YEAR 4</td>
<td>• Capstone Design • Engineering Focus Courses</td>
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There are courses to provide experiential training at all levels.

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<tr>
<th>YEAR 1</th>
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<tr>
<td>• NANO 4: <em>Experience Nanoengineering</em> (1 units)</td>
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<th>YEAR 2</th>
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<tr>
<td>• NANO 20L: <em>Nanomaterials Synthesis</em> (1 unit) – will be offered next year, concurrent with NANO 102: <em>Chemical Principles</em></td>
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<th>YEAR 3</th>
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<tr>
<td>• NANO 100L: <em>Physical Properties of Materials Laboratory</em> (4 units, NANO 108: <em>Materials Science</em> prereq)</td>
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<th>YEAR 4</th>
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<tr>
<td>• NANO 119: <em>Engineering Design</em> (1 unit)</td>
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<tr>
<td>• NANO 120 A&amp;B: <em>Nanoengineering System Design, Capstone Design</em> (8 units, 2 quarters)</td>
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Department of NanoEngineering – B.S./M.S. Program

Advanced B.S./M.S. Program

• A contiguous program leading to a bachelor of science and a master of science degree in nanoengineering is offered to a student with junior standing who has an upper-division GPA of 3.5 or better.

• Students are admitted without having to take the GRE(!!).

• The degree is offered under both the Thesis Plan and the Comprehensive Examination Plan.
Department of NanoEngineering – Opportunities

All incoming NANO students will be assigned a faculty advisor for your first year.

What can I discuss with my faculty advisor?
• Academics questions related to Nanoengineering
• Research areas of interest & opportunities
• Courses
• Internships/volunteer opportunities/organizations
• Developing academic goals
• Graduate school
• Career
• University life
• And so much more…
NANO students can now earn a minor in Data Science!

The emerging discipline of **Materials Informatics** is at the intersection of materials science, computational science, and information science.

Data science tools are currently being developed to **accelerate the rate at which new materials can be designed, manufactured, and deployed.**

[https://datascience.ucsd.edu/academics/undergraduate/advising/](https://datascience.ucsd.edu/academics/undergraduate/advising/)
Department of NanoEngineering – Opportunities

EnVision
Arts and Engineering Maker Studio

- Hands-on classes
- Open hours for your own projects

The Jacobs School’s Makerspace
SME 301
Department of NanoEngineering – Career Development

- Career Center (Campus-wide)
- Panels on graduate school & industry
- Resume workshops
- Local outreach (Fleet Science Center)
- Undergraduate development/service orgs
Department of NanoEngineering – Undergrad Research

We are proud of the research opportunities for undergraduates

• Some research groups have as hosts as many as 20(!) undergrads
• Research can be taken on a volunteer basis or for NANO 199 technical elective credit
• Many opportunities exists for getting funded over the summer
• Write emails to professors, take them to coffee, talk to TAs, show up (hopefully invited!) to group meetings, be persistent!!!
NANO 199. Independent Study for Undergraduates

Independent research on an unsolved problem with a faculty member

• Equivalent to Senior Thesis
• Two consecutive quarters
• Faculty member will work 1 on 1 with you at weekly meetings
Department of NanoEngineering – Support

Each student has two advisors:
• Department Advisors – help with major related courses and questions
• College Advisors – help with general education and university-wide questions

We love our student orgs!
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“There’s plenty of room at the bottom…”
There’s plenty of room for You!