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Realizing future solutions… today

NANOENGINEERING DEGREE PROGRAM

www.nanoengineering.ucsd.edu

Professor Tod A Pascal (tpascal@ucsd.edu)

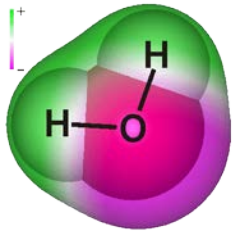
UC San Diego

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!)

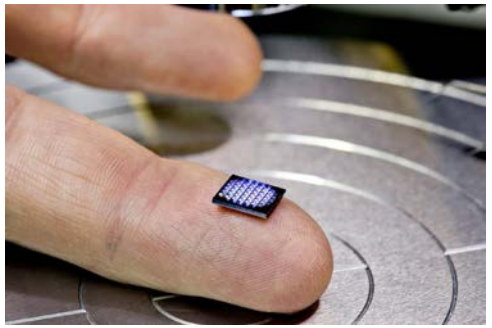
Department of NanoEngineering – Overview

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

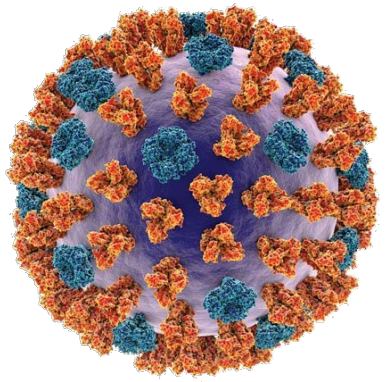


Water molecule
~0.3 nm

DNA
~2 nm



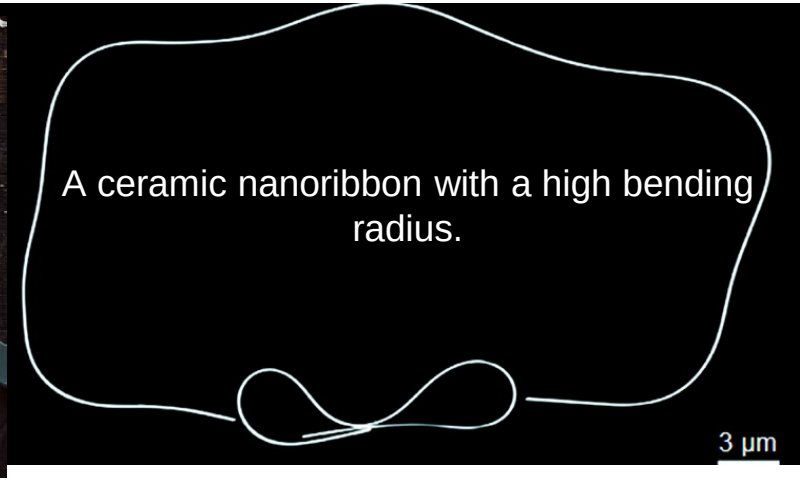
Transistor
~10 nm

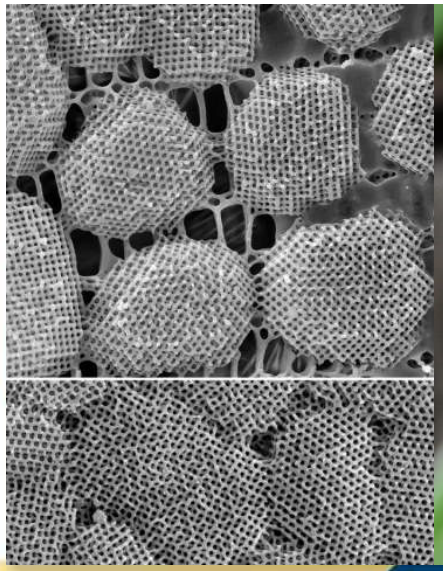


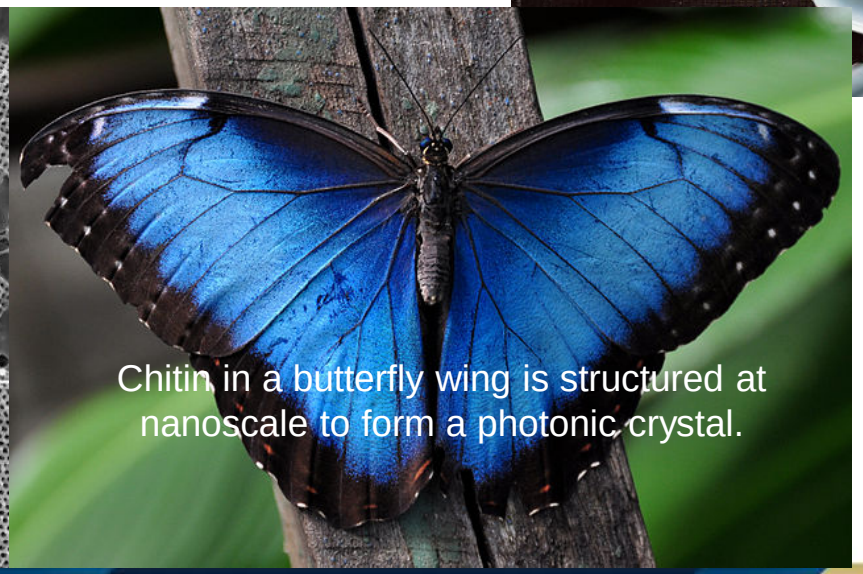
SARS-CoV-2 Virus
~100 nm

Department of NanoEngineering – Overview

You will learn why things behave differently at the nanoscale than in our macroscopic world.







Department of NanoEngineering – Overview

New solutions to Grand Challenges

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

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Department of NanoEngineering – Overview

You will learn about and be trained to use specialized tools to "see" at the nanoscale.

Optical Microscope

Electron Microscope

Neutron Source (Oak Ridge, TN)

X-ray Source (ALS, Berkeley, CA)

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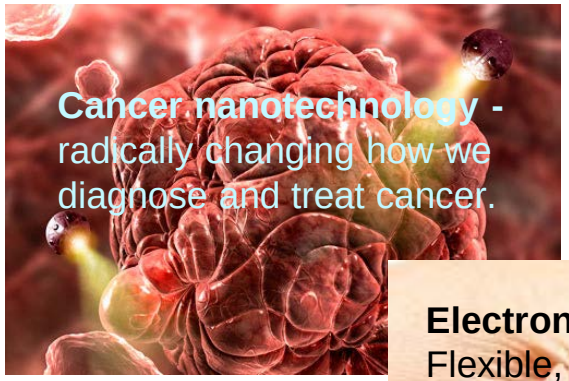
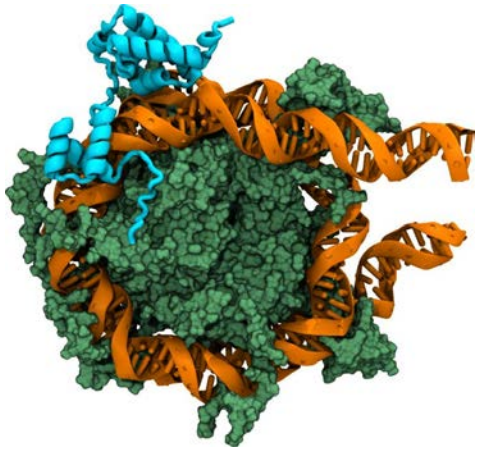
Department of NanoEngineering – B.S. Program

Nanoengineering is highly interdisciplinary.





Computer Simulations & Theory

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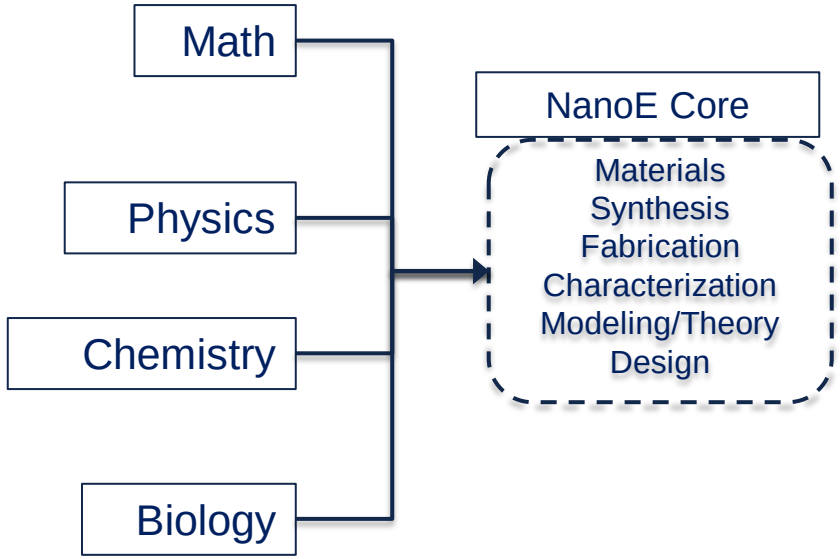
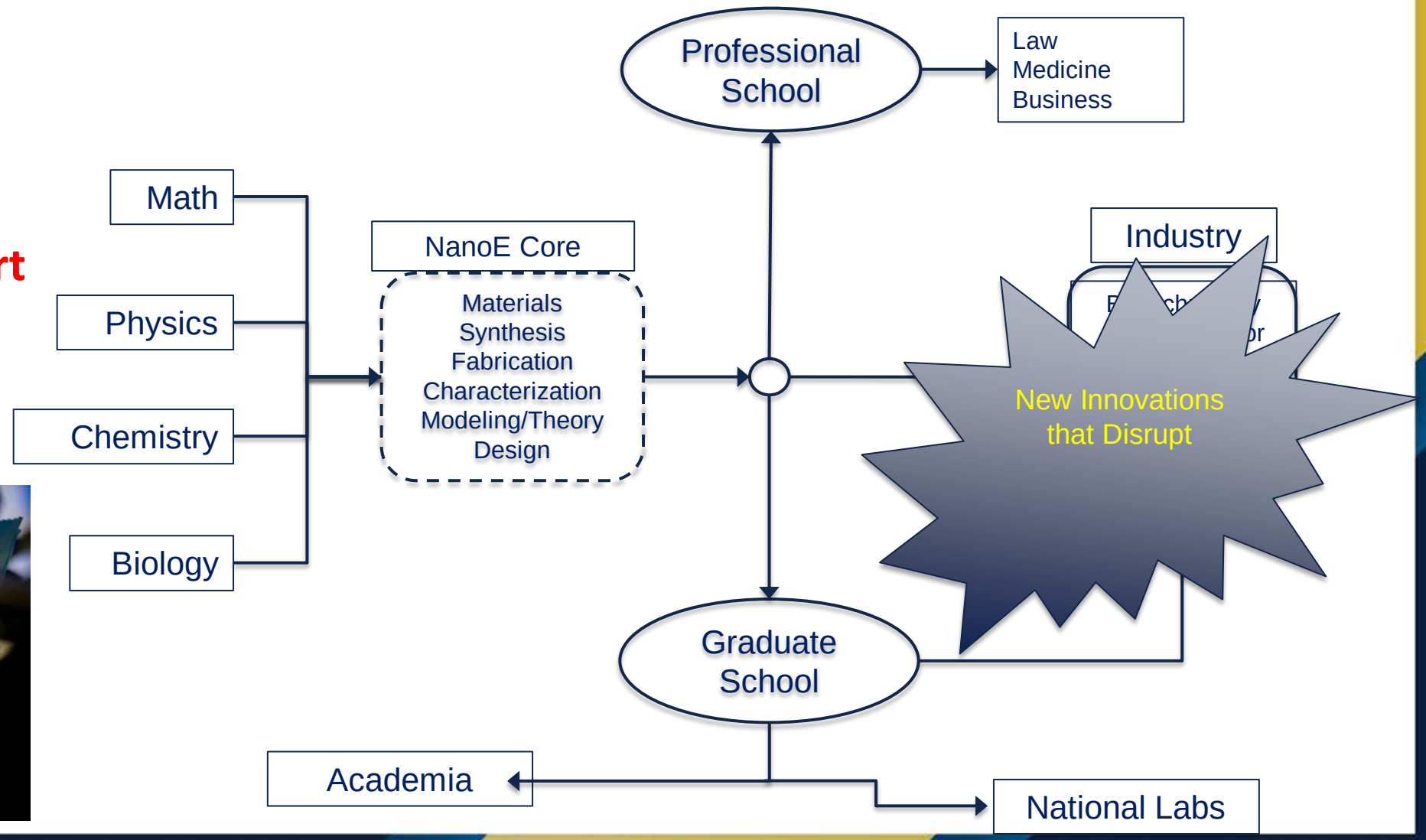
Department of NanoEngineering – B.S. Program

A degree in Nanoengineering gives you a jumpstart in training.



Department of NanoEngineering – B.S. Program

A degree in Nanoengineering gives you a jumpstart in your career.



Department of NanoEngineering – B.S. Program

The NANO curriculum will teach you a different engineering skillset than other majors

YEAR 1	• *Engineering Prep*
YEARS 2-3	• *Fundamentals in Applied Science* (102:Chemistry, 104:Physics, 103:Biology, 106:Crystallography) • *Nanoengineering Skillset* (111:Characterization, 107:Electronics, 112:Fabrication, 110:Modeling)
YEAR 4	• *Capstone Design* • Engineering Focus Courses

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Department of NanoEngineering – B.S. Program

There are courses to provide experiential training at all levels.

YEAR 1	• NANO 4: *Experience Nanoengineering* (1 units)
YEAR 2	• NANO 20L: *Nanomaterials Synthesis* (1 unit) – will be offered next year, concurrent with NANO 102: *Chemical Principles*
YEAR 3	• NANO 100L: *Physical Properties of Materials Laboratory* (4 units, NANO 108: *Materials Science* prereq)
YEAR 4	• NANO 119: *Engineering Design* (1 unit) • NANO 120 A&B: *Nanoengineering System Design, Capstone Design* (8 units, 2 quarters)

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…

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Department of NanoEngineering – Opportunities

NANO students can now earn a minor in Data Science!

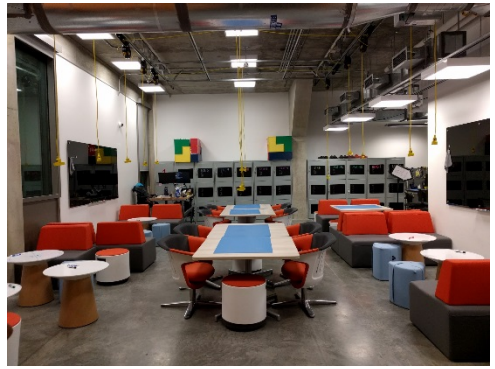
The emerging discipline of **Materials Informatics** is at the intersection of materials science, computational science, and information science.

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/

Department of NanoEngineering – Opportunities

EnVision
Arts and Engineering Maker Studio



The Jacobs School's Makerspace

SME 301

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

EnVISIONARIES

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Department of NanoEngineering – Career Development

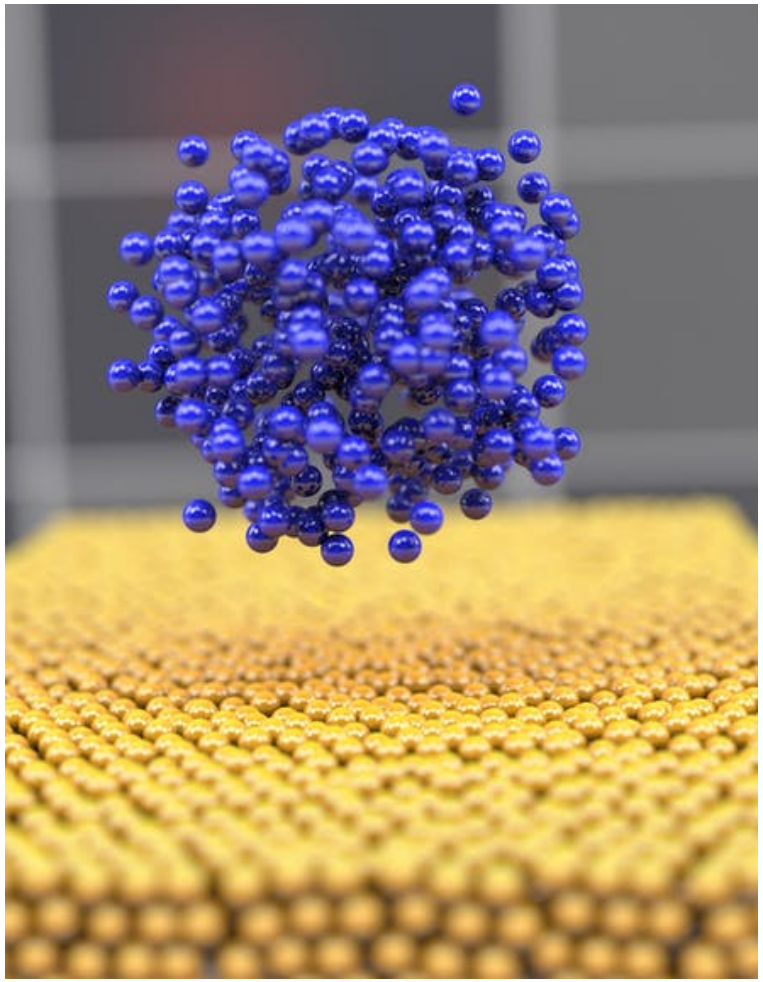
- Career Center (Campus-wide)
- Panels on graduate school & industry
- Resume workshops
- Local outreach (Fleet Science Center)
- Undergraduate development/service orgs

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!!!

Department of NanoEngineering – Undergrad Research



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!

AIChE
The Global Home of Chemical Engineers

NETS
NANOENGINEERING & TECHNOLOGY SOCIETY

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Department of NanoEngineering

Realizing future solutions… today

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“There’s plenty of room at the bottom…”

There’s plenty of room for **You!**

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