



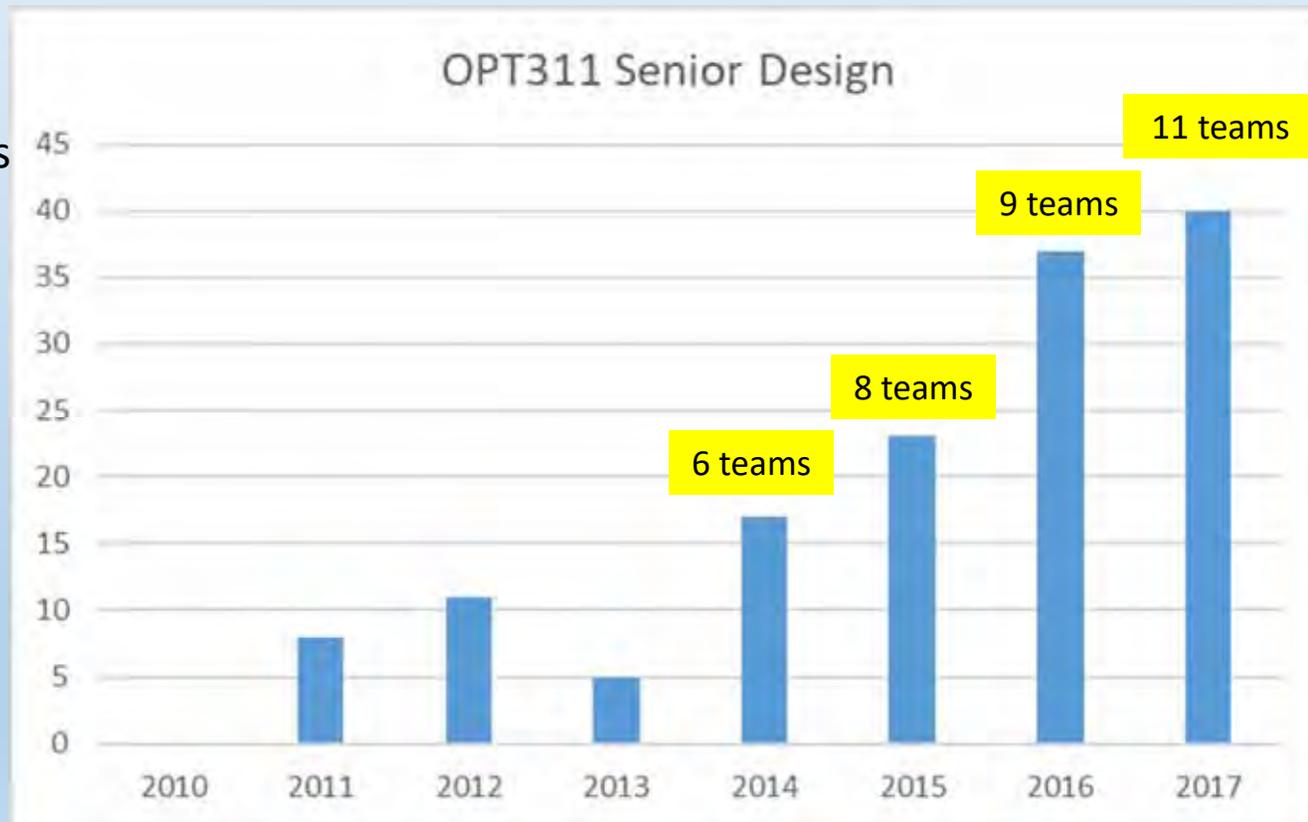
Optical
Engineering
Senior Design
OPT310
&
Optics
Senior Thesis
OPT320

2017-2018
Fall Update

Professor
Wayne H. Knox

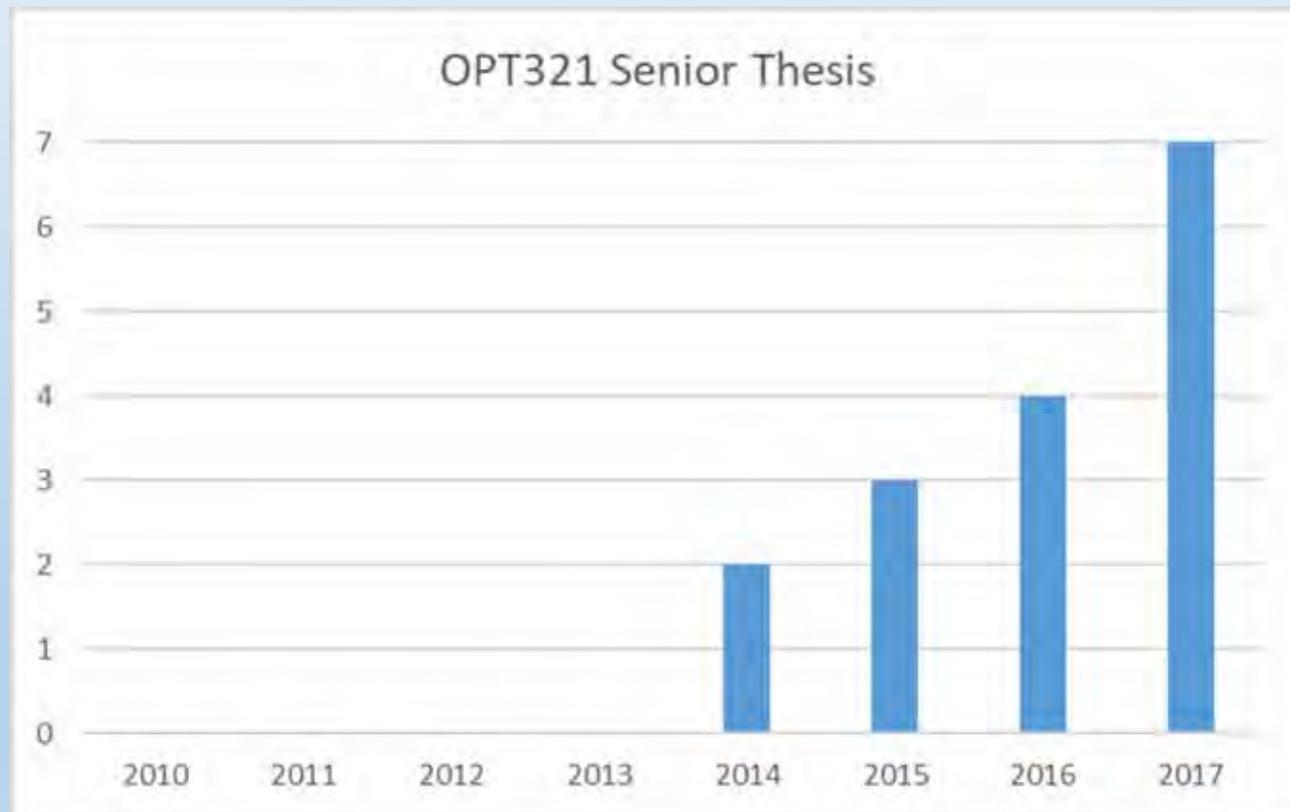
Growth in Optics Senior Design Class

#Students



Growth in Optics Senior Thesis Class too

#Students



Fall semester Senior Design

- Fundamentals: How to Interview a potential Customer
 - In-class exercise WHK President of Zapp Photonics Intl. (ZAPPI)
- Interview customers
- Decide team project choices, submit essay
- WHK assign teams
- Assemble teams
- Start bi-weekly interviews with customers
- Determine Product Specifications, customer needs and wants
- Draft a Product Requirements Document
 - 1st, 2nd and 3rd revisions
 - Review in class every two weeks
- Final Product Requirements Document submitted by Teams
 - PRD includes draft timeline, project budget, equipment lists etc.

Team Proposals

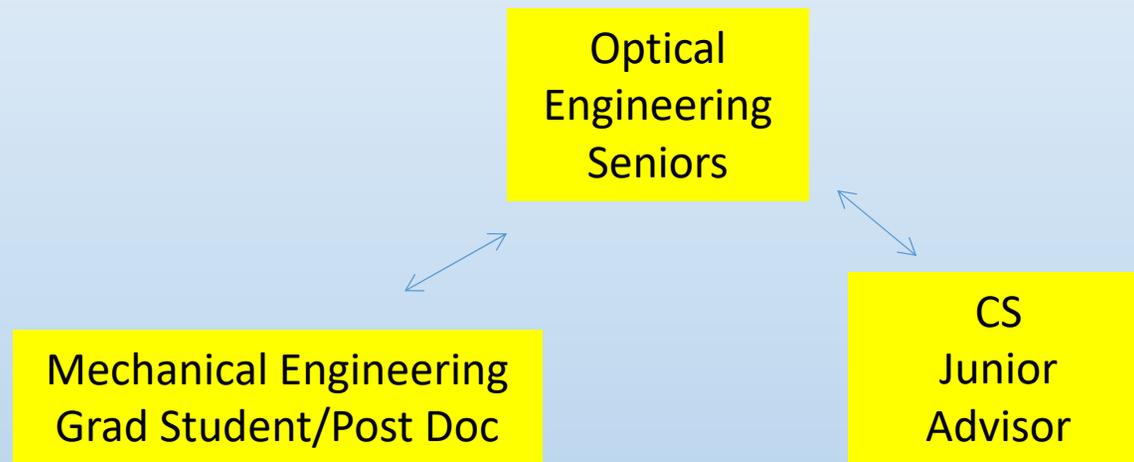
- Formal Cover Letter
 - “Applying for the job”
- One-page CV
 - In my specific format
- Two-page essay
 - Three paragraphs
 - Detail first, second and third team project choices
 - Detail qualifications, motivation
 - Any suggested teaming

Important lessons (senior class)

LAST CHANCE !!

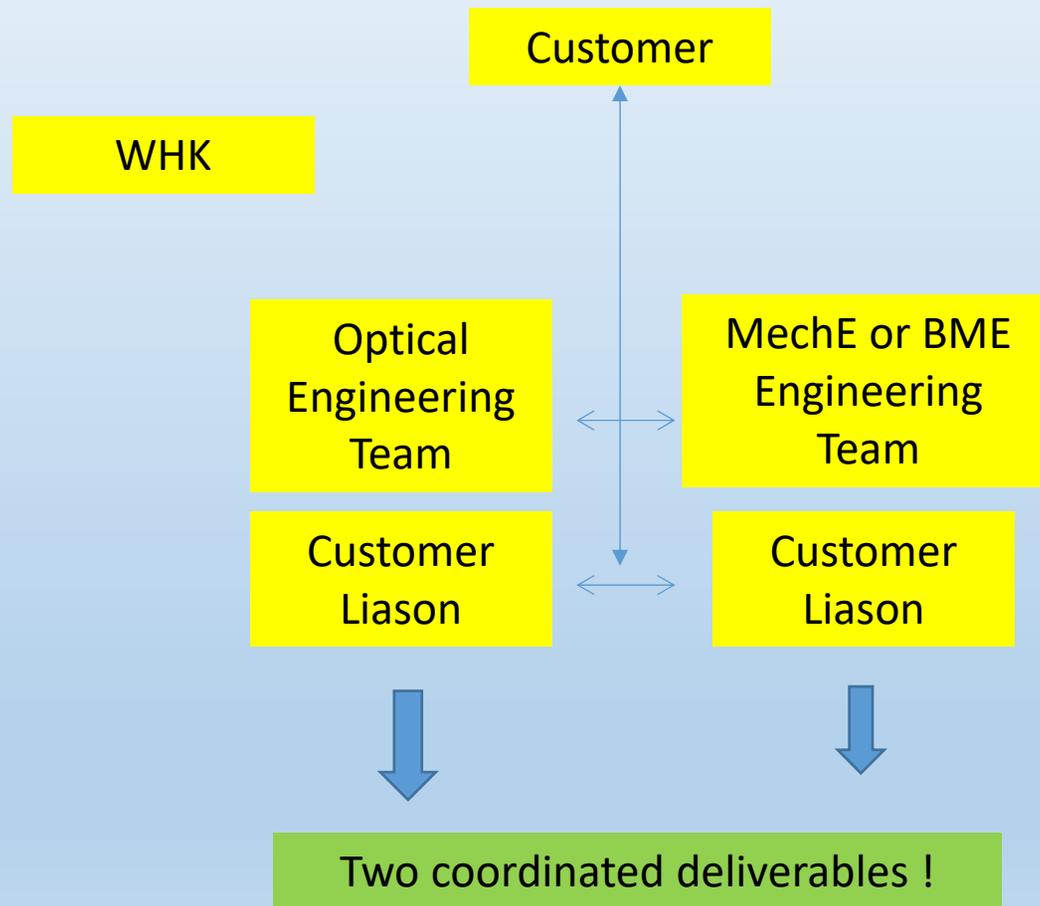
- Favorite class questions include:
- “Prof. Knox, does the One Page Essay have to be one page ?”
 - YES of course !!!
- Assignment is due at 6:00pm ; “Prof. Knox, does 7:30pm submission constitute a late submission ?”
 - YES 0/15 points

Design Teams with Interdisciplinary Needs



Augment teams with Engineering Advisors

Interdisciplinary Parallel Teams



+ Faculty Advisors, Junior Engineering Advisors, Grad Students and Post-Docs

Eleven Teams for 2017-2018:

- Vikram Dogra, M.D. and Dr. Navalgund Rao (URMC)
 - Aspheric Acoustic Fresnel Lenses for Photoacoustic Imaging of Thyroid Cancer
- Dr. Robert Hill, MD (Harmonigenic)
 - Second harmonic imaging system for metastatic breast cancer screening
- Dr. Tao Chen (ASML) OPT-MechE Double Team ?
 - Optical source coherence length measurements system for lithography mask aligner
- Dr. Jennifer Kruschwitz (UR Optics)
 - System for accurate measurement of silicon dioxide film thickness using a two beam technique

Teams, (cont)

- Todd Blalock (Optimax)
 - Tolerancing and testing of a freeform monolithic telescope
- Russ Hudyma (Navitar)
 - Plenoptic imaging camera system image simulator and system design
- Calvin Uzelmeier (Rochester Museum and Science Center)
 - Design, fabrication and testing of a new Optics exhibit showcasing a Rochester Optics Company or a technology developed by a woman scientist
- Arnulfo Torres, RN Optics, BME and MechE triple team ?
 - Novel optical system approach to quantitatively measuring the patient response in Tuberculosis testing

Teams (cont.)

- Dr. Ahmed Ghazi and Dr. Greg Schmidt (URMC/Optics) Optics Mech E Double Team / possibly BME triple team
 - Near infrared light surgical trainer, design fabricate and test
- Dr. Brandon Zimmerman (NASA/DigitEyes)
 - Image simulator for vision testing to minimize autorefractor errors
- Dr. James Francis (Raptor startup)
 - Wide angle lens designs for high speed 360 degree Virtual Reality/Augmented Reality cameras

Senior Thesis Students OPT320

- Discuss research interests with WHK, develop list of five professors to interview
- Interview with five professors, take lots of notes
- Negotiate a position in a research group
- Write up one page CV, Research search summary, and formal cover letter applying for the position
- Fall semester – write a NSF-style thesis proposal

Senior Design/Senior Thesis Intellectual Property track

- Reid Cunningham UR Ventures
 - Introduction to Patents, Copyrights and Trademarks
 - Patents and the Patenting Process
 - Finding Inventions in Your Work
- Patent Analysis Assignment
 - Read and understand a US Patent assigned
 - Eight recent patents in WHK chosen area
 - Patent Analysis
 - Summary statement – what the patent is all about
 - Submit assignment
 - Groups present patents/discuss in class
- WHK “IP Wars”
 - WHK experience in University, Government Labs, Bell Labs
 - WHK Experience as Expert Witness (5 cases+)
 - WHK Experience as Founder of Clerio Vision, Inc.
 - WHK >50 US Patents (>153 International Patents wipo.int)
 - Pre-employment agreements, IP agreements, UR IP Agreement, etc.

“Laser Pointer”

“Laser Scanner”

“3D Imaging”

“VR/AR systems”

ABET Topics (also for thesis students)

- Professional Ethics in Optical Engineering and Science
 - Lecture
 - In-class exercise – role playing
 - In—class 5-minute essay
- Commitment to Lifelong Learning
 - Lecture
 - In-class exercises/discussion
 - In-class 5-minute essay
- Commitment to Sustainable Optical Engineering
 - Lecture
 - In-class exercise – role playing
 - In-class 5-minute essay

Spring semester Senior Design

- Execute the plan
- Report to the class every two weeks
- Meet with customers every two weeks
- Drafting Design Description Document
 - 1st, 2nd, 3rd revisions
- Rehearse “Elevator Pitch” 90 seconds
 - Shotgun session at Spring IA Meeting
- Final customer presentation
- Submit final DDD
- Present posters at Hajim School Design Day
- Deliver prototypes/reports (deliverables) to customers
- WHK Customer survey

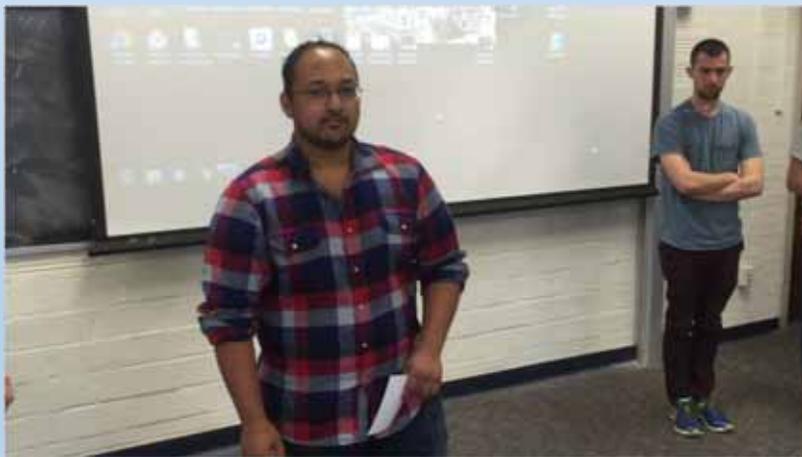
Spring Semester Senior Thesis

- Do your research as specified in your thesis proposal
- Midterm review
- Final presentation and thesis writeup

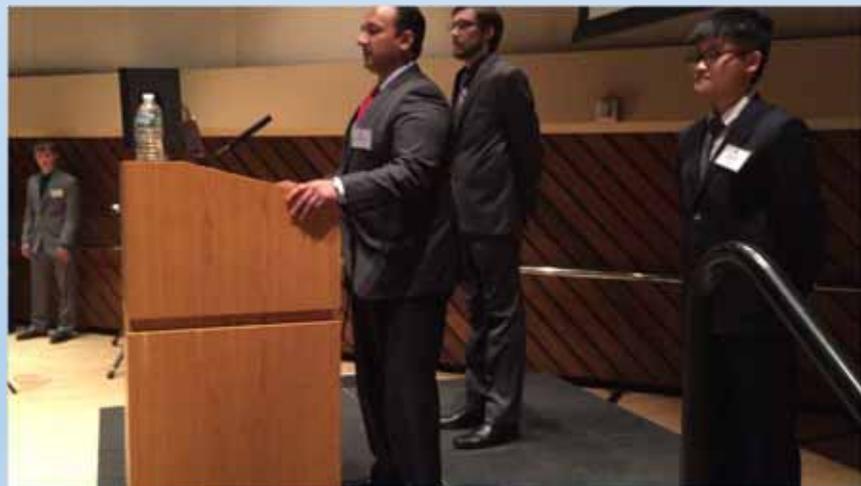
OPT310/320 are Writing/Speaking Courses !

- Drafting, revising finalizing Product Requirement and Design Description Documents
- In class formal Design Reviews
- Practice 90 second Elevator Pitches (Spring IA mtg)

Before

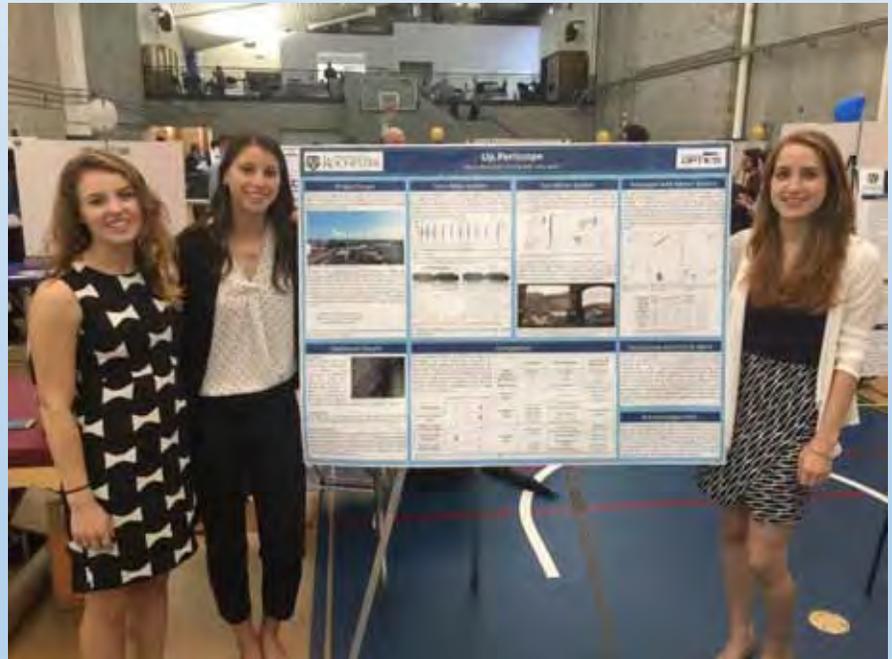


After



Hajim School Design Day

- All Hajim School Departments present the results of their Senior Design (and Senior Thesis) work



Is your Company Interested in being a Senior Design Customer ?

- Let me know by August, 2018
- How about this ? Hire an Optics Junior intern for summer 2017, and then we can assign the student to your design team for the academic year 😊
- Let's talk !

SENIOR DESIGN I : Fall 2017



Nancy Aguilera



Katherine Armstrong



Madilyn Beckman



Michael Brunsmann



Stephen Chess



Pellegrino Conte



Yang Deng



Lei Ding

Stephen Chess



James Emery

Pellegrino Conte



Daniel Graney

Yang Deng



Yichen Gu

Lei Ding



Ali Hashim



Xiaojing Huang



Ava Hurlock



Joseph Kelly



Wooyoun Kim

Xiaojing Huang



Haley Knapp

Ava Hurlock



Kevin Kuyk

Joseph Kelly



Nora Lane

Wooyoun Kim



Sze Wah Lee



Zilong Li



David Lippman



Weidi Liu



Diana Magana

Zilong Li



Barry Magenya

David Lippman



Diego Martinez

Weidi Liu



Matthew Page

Diana Magana



Jordan Rabinowitz



Ryan Sauer



Rebecca Silver



Mitchell Soufleris



Wen Zhou

Ryan Sauer



Zheng Tan

Rebecca Silver



Chih-Hsuan Tsao

Mitchell Soufferis



Perry Wang

Jeremy Staffa



Yuanchao Wang



Stephen Watson



Maxwell Wolfson



Yubai Yang



Weichen Yao

Senior Thesis Students

Mail - wknox@UR.Rochester... AOL Mail (11473) Instructor Access - Blackboard Learn Blackboard Learn

https://www.rochester.edu/webapps/UrlR-InstructorView-BBLEARN/access_plus/displayImage.jsp?CRN=36114&type=0&gradType=2 170% Search

SENIOR THESIS I : Fall 2017



Jonathan Dietz



Brandon Dube



Jonathan Heinz



Markus Rothacker



Oscar Ta



Kaia Williams



Jeremy Staffa

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