LUX ET SPES

STONEHILL COLLEGE

Photonics Programs at Stonehill College: Bridging Education & Industry

Authors: G. Gu,* C. Schnitzer,* N. Vu,*† B. Bacon,*† R. Adams, T. Seaward,† J. Evora,† J. Wong,† C. Dwyer,† and C. Leonard†

*Presenters †Students

- Photonics & Optical Engineering Certificate
- Majors & Minors
- Lab Research

stonehill.edu/photonics

Certificate

Major

LEAP

What brings students to certificate program?

Division of Graduate and Professional Studies

Technology-centric

Daisy

Technology-curious

Matthew

- Immediate employment
- No math/science background assumed
- Hands-on learning, little to no homework
- 12-months, 24-college credits, 3 nights/week

Snapshot of Student Demographics

2020-21 Student Cohort

- Gender: 2 women, 9 men
- Age range: 18 to 49
- Reported race and ethnicity:
  - 1 Hispanic/Latinx
  - 5 White/Caucasian
  - 3 Black/African American
  - 1 Asian
  - 1 Two or More Races
- Educational backgrounds:
  - 3 Associates Degree
  - 2 College Courses/Degree
  - 6 High School or Equivalent

2021-22 Student Cohort

- Gender: 1 woman, 7 men
- Age range: 18 to 48
- Reported race and ethnicity:
  - 0 Hispanic/Latinx
  - 3 White/Caucasian
  - 2 Black/African American
  - 3 Asian
  - 0 Two or More Races
- Educational backgrounds:
  - 2 Associates Degree
  - 3 College Courses/Degree
  - 3 High School or Equivalent

2022-23 Student Cohort

- Gender: 3 women, 4 men
- Age range: 17 to 57
- Reported race and ethnicity:
  - 0 Hispanic/Latinx
  - 3 White/Caucasian
  - 0 Black/African American
  - 4 Asian
  - 0 Two or More Races
- Educational backgrounds:
  - 2 Associates Degree
  - 1 College Courses/Degree
  - 4 High School or Equivalent

2023-24 Student Cohort

- Gender: 4 women, 7 men
- Age range: 17 to 51
- Reported race and ethnicity:
  - 0 Hispanic/Latinx
  - 8 White/Caucasian
  - 1 Black/African American
  - 2 Asian
  - 0 Other/Two or More Races
- Educational backgrounds:
  - 2 Associates Degree
  - 1 College Courses/Degree
  - 8 High School or Equivalent

Job Opportunities

- First cohort: 100% securing high-tech internships and jobs at top manufacturing/photonics companies
- Starting salaries $40,000 - $60,000 per year, plus bonuses, benefits, money towards education and overtime

Financial Assistance Available

- Partner companies hiring certificate students, even before graduation!
- Tuition $12,264
- Company sponsors
- Scholarships and “work & learn” flexible options

What are Students Saying about the program?

"You saw in me something that I had sometimes wondered was still there: potential, capability, and promise."

"Thank you for affording me the opportunity to further myself and be a better member of society."

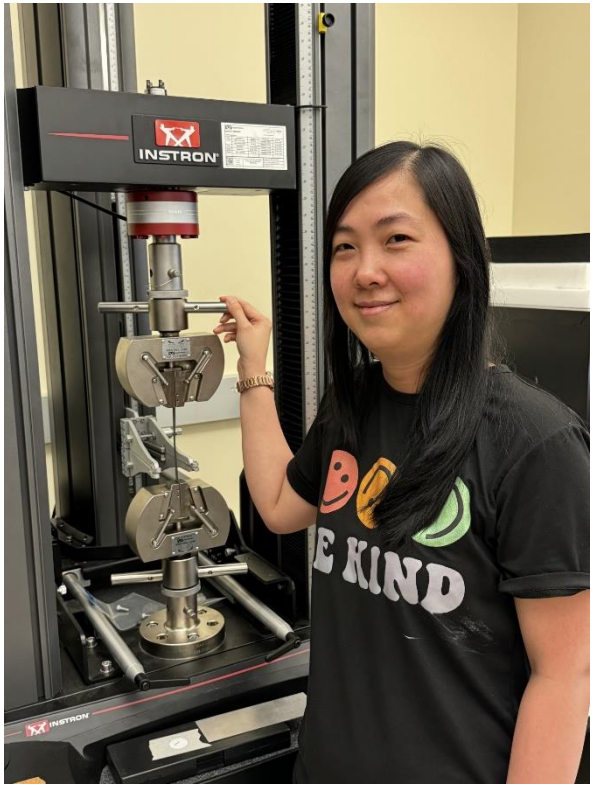
"Two thumbs up because of cutting edge learning opportunities. It feels good to be a pioneer in the field..."

"The certificate program is my start to higher education."

"The certificate internship/job fuses the coursework into a real-world experience for the students. Thank you!"

What does this certificate program mean to me?

When I was in Vietnam, I worked at a taxi company. Since I have come to the United States nine years ago, I have worked in a nail salon. This program means an exciting high-tech job, with benefits, and opportunities to grow!



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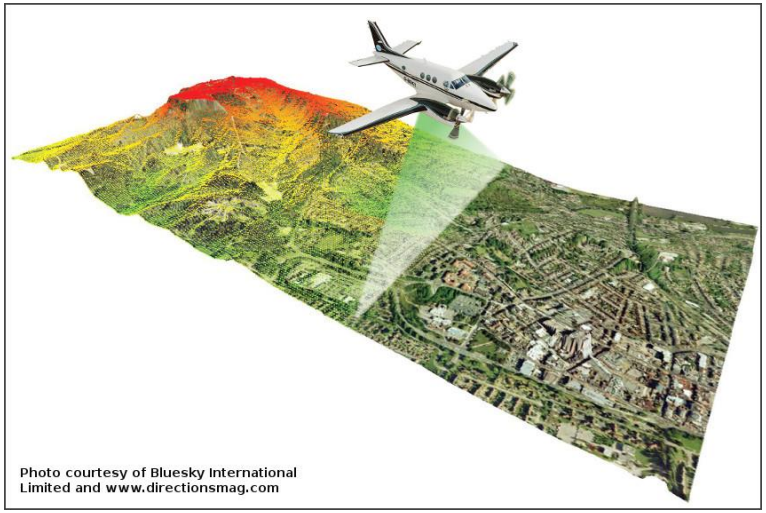
Partner Companies

Where am I going next?

I will be completing the coursework in the certificate program on August 14th. I am applying now for jobs. I hope to work at 3DEO as a technician to build airborne LiDAR mapping systems.

3DEO

Norwood, MA



Wide-area 3D mapping is accomplished as the airborne LiDAR scans the ground while flying along. Accurate sensors onboard the aircraft measure its position and orientation; when combined with the laser rangefinder measurements, an accurate, geolocated 3D image of the ground is obtained.

Reference: https://3deo.biz/applications

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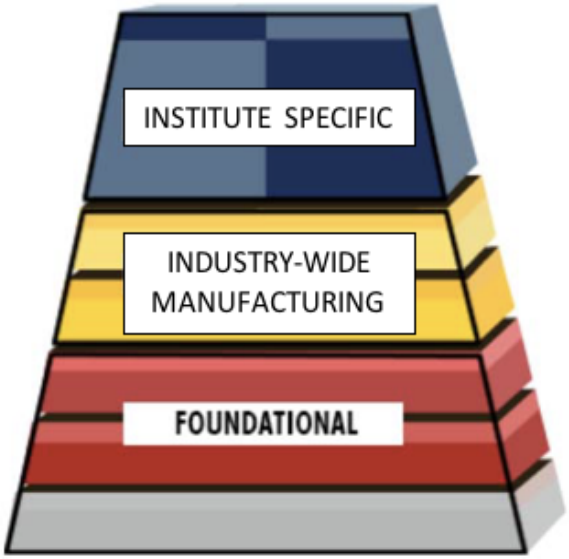

PHOE 164 Photonic Integrated Circuits

PHOE 162 Introduction to Optical Fibers

PHOE 160 Introduction to Optics

PHOE 154 Statistical Process Control in Photonics & Automation

PHOE 152 Digital Fundamentals

PHOE 150 Tools for Advanced Manufacturing & Photonics

PHOE 144 Tools and Testing Equipment

PHOE 142 Electricity and Electronics

PHOE 140 Intro. to Advanced Manufacturing & Photonics

Fall	Spring	Summer	Summer
Fundamentals Introduction and foundational courses (7 credits)	**Intermediate** Manufacturing courses (7 credits)	**Advanced** Photonics-specific courses (7 credits each)	**Internship** PHOE 190 course (3 credits)

Curriculum: https://spie.org/education/photonicstechnicianprogram?SSO=1#_=_

Earn Seven Certificates in the Program

- Photonics Certificate of Completion
- OSHA 10-hour General Industry Safety and Health Training
- Laser Safety Awareness Training from the Laser Institute
- EDU-A120, Units - The Language of Measurement
- EDU-A110, Introduction to Dimensional Metrology
- STM-120, Statistical Process Control Basics
- STM-110, Measurlink Basics

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Photonics Certificate Program

Certificate credits may transfer into 4-year photonics programs

B.S.

Photonics B.S.		
Required		
Physics I	PHY 121	4 credits
Problem Solving I	PHY 105	1 credits
Physics II	PHY 122	4 credits
Problem Solving II	PHY 205	1 credits
Physics III	PHY 221	4 credits
Optics	PHY 310	3 credits
Photonics	PHY 320	3 credits
Optics/Photonics Lab	PHY 330	3 credits
Integrated Photonics	PHY 370	3 credits
Quantum Physics	PHY 323	3 credits
Electromagnetism	PHY 324	3 credits
Electronics	PHY 325	4 credits
Semiconductor materials/devices	PHY 340	3 credits
Plus Two Electives		39
Laser systems & applications	PHY xxx	3 credits
Labview	PHY xxx	3 credits
Quantum Optics	PHY xxx	3 credits
Electro-optics	PHY xxx	3 credits
Internship		3 credits
Nanophotonics	PHY xxx	3 credits
Optical communications	PHY xxx	3 credits
Optical imaging and sensing	PHY xxx	3 credits
Fiber optics	PHY xxx	3 credits
Photonic material/device	PHY xxx	
Other required courses		6
Gen. Chem I	CHM 113	4 credits
Calculus I	MTH 125	4 credits
Calculus II	MTH 126	4 credits
Multivariable Calculus	MTH 261	4 credits
		16
		Total credits
		61

B.A.

Photonics B.A.		
Required		
Physics I	PHY 121	4 credits
Problem Solving I	PHY 105	1 credits
Physics II	PHY 122	4 credits
Physics III	PHY 221	4 credits
Optics	PHY 310	3 credits
Photonics	PHY 320	3 credits
Optics/Photonics Lab	PHY 330	3 credits
Electromagnetism	PHY 324	3 credits
Electronics	PHY 325	4 credits
Problem Solving II	PHY 205	1 credits
Plus Two Electives		30
Integrated Photonics	PHY 370	3 credits
Laser systems & applications	PHY xxx	3 credits
Labview	PHY xxx	3 credits
Semiconductor materials/devices	PHY 340	3 credits
Electro-optics	PHY xxx	3 credits
Quantum Optics	PHY xxx	3 credits
Quantum Physics	PHY 323	3 credits
Internship		3 credits
Fiber optics	PHY xxx	3 credits
Nanophotonics	PHY xxx	3 credits
Optical communications	PHY xxx	3 credits
Optical imaging and sensing	PHY xxx	3 credits
Photonic material/device	PHY xxx	3 credits
Other required courses		6
Gen. Chem I	CHM 113	4 credits
Calculus I	MTH 125	4 credits
Calculus II	MTH 126	4 credits
Multivariable Calculus	MTH 261	4 credits
		16
		Total credits
		52

Minor

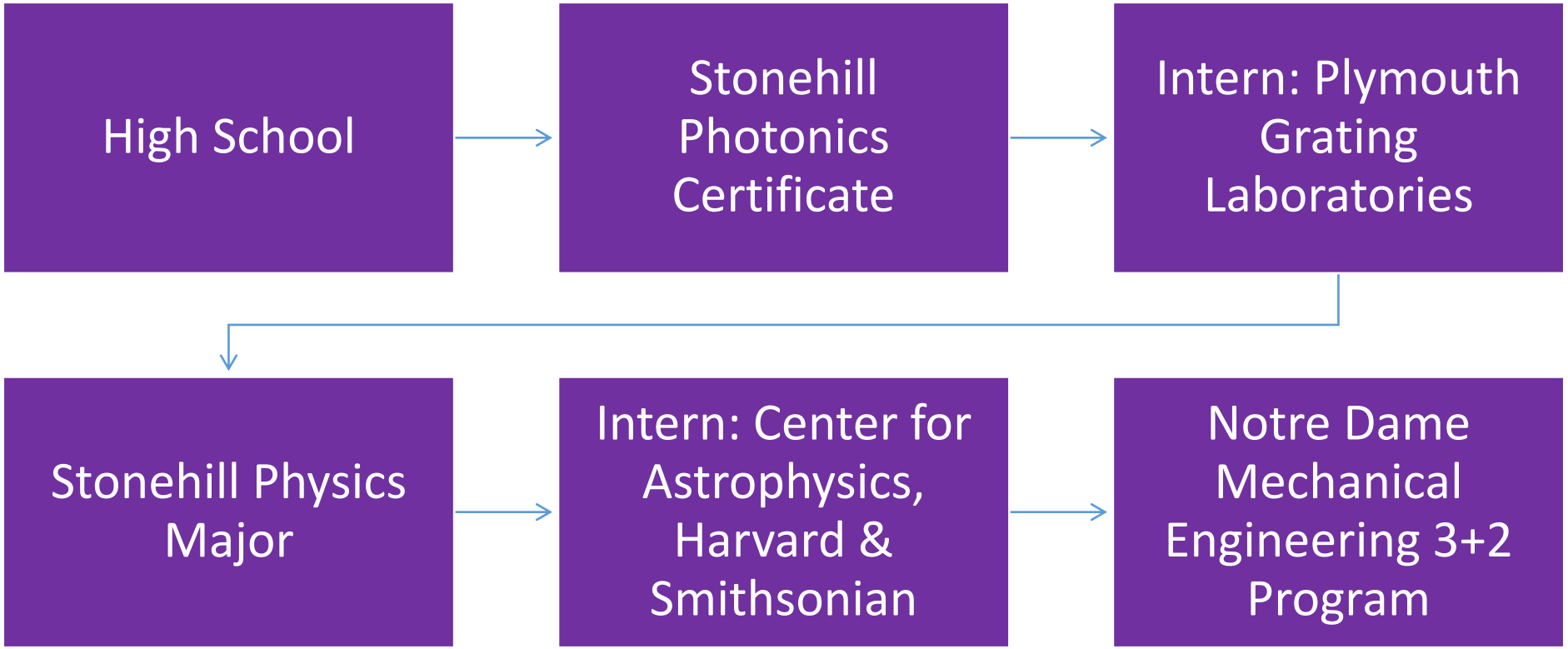
Photonics Minor:		
Required		
Physics I	PHY 121	4 credits
Physics II	PHY 122	4 credits
Physics III	PHY 221	4 credits
Optics	PHY 310	3 credits
Photonics	PHY 320	3 credits
Optics/Photonics Lab	PHY 330	3 credits
Plus One Electives		21
Laser systems & applica	PHY xxx	3 credits
Quantum Physics	PHY 323	3 credits
Electromagnetism	PHY 324	3 credits
Electronics	PHY 325	4 credits
Semiconductor materia	PHY 340	3 credits
Electro-optics	PHY xxx	3 credits
Labview	PHY xxx	3 credits
Integrated Photonics	PHY 370	3 credits
Fiber optics	PHY xxx	3 credits
Nanophotonics	PHY xxx	3 credits
Optical communications	PHY xxx	3 credits
Optical imaging and ser	PHY xxx	3 credits
Photonic material/devic	PHY xxx	4 credits
		3 or 4
		Total credits
		24 - 25

Certificate

Photonics certificate:		
Required		
Intro. To Adv. Manuf. And Photonics	PHOE 140	3 credits
Electricity and Electronics	PHOE 142	2 credits
Tools and Testing	PHOE 144	2 credits
Tools and Materials for Advanced Manufacturing	PHOE 150	2 credits
Digital Fundamentals	PHOE 152	2 credits
Statistical Process Control in Photonics and Automation	PHOE 154	3 credits
Intro. To Optics	PHOE 160	2 credits
Intro. To Optical Fibers	PHOE 162	2 credits
Integrated Optics	PHOE 164	3 credits
Photonics Apprenticeship	PHOE 190	3 credits
		24
		Total credits
		24

Photonics Certificate Program

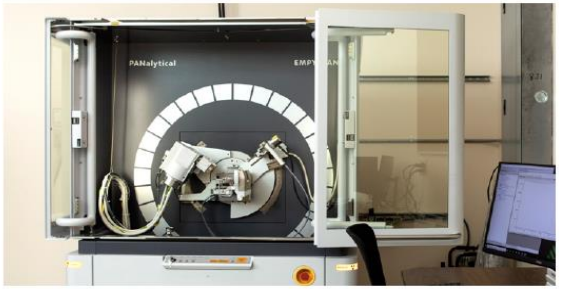
Education and Industry Path of Gabriel Woolf:



LEAP @STONEHILL

Funded by a $2.4 million grant from the Massachusetts Manufacturing Innovation Initiative (M2I2), LEAP@Stonehill is an integral part of the AIM Photonics Academy LEAP network. The Stonehill College lab in Easton, Massachusetts, offers state-of-the-art equipment.

LEAP@Stonehill Capabilities



Photonics Material Characterization

- XRD
- Raman
- UV-vis
- Instron Material Stress/Strain
- Ellipsometer
- FTIR+PL
- Hyperspectral Imaging System With FTIR
- Cryostat for Both FTIR Systems

High-Speed Photonics System and Device Testing

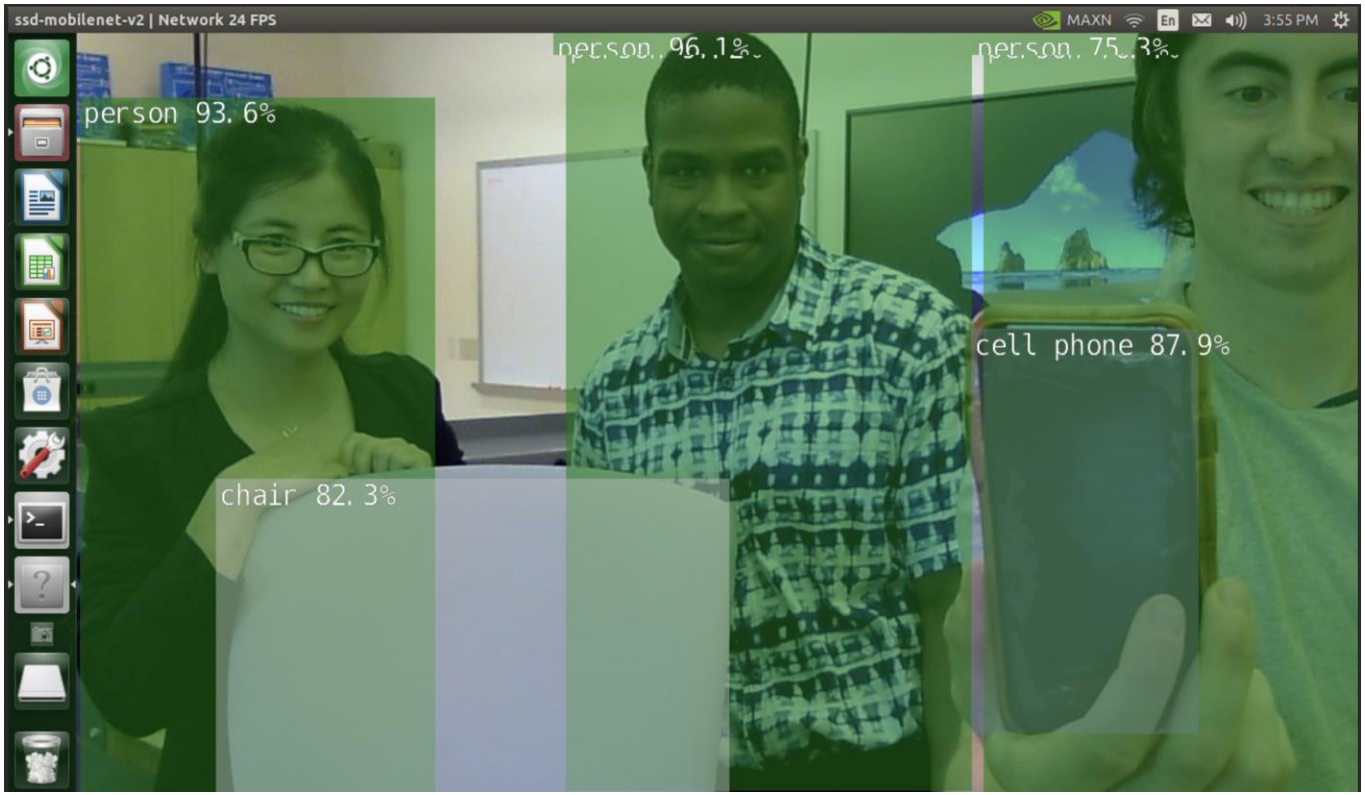
- Mapleleaf Auto Fiber Aligner
- Lightwave Component Analyzer
- 25 GHz Oscilloscope and AWG
- Polarization Extension Ratio Analyzer
- Scanning Electron Microscope (SEM)
- Modulator
- Optical Spectrum Analyzer
- Source Meter
- Ball/Wedge Wire Bonder; Pull/Shear Test

Fundamental Manufacturing and Electronics

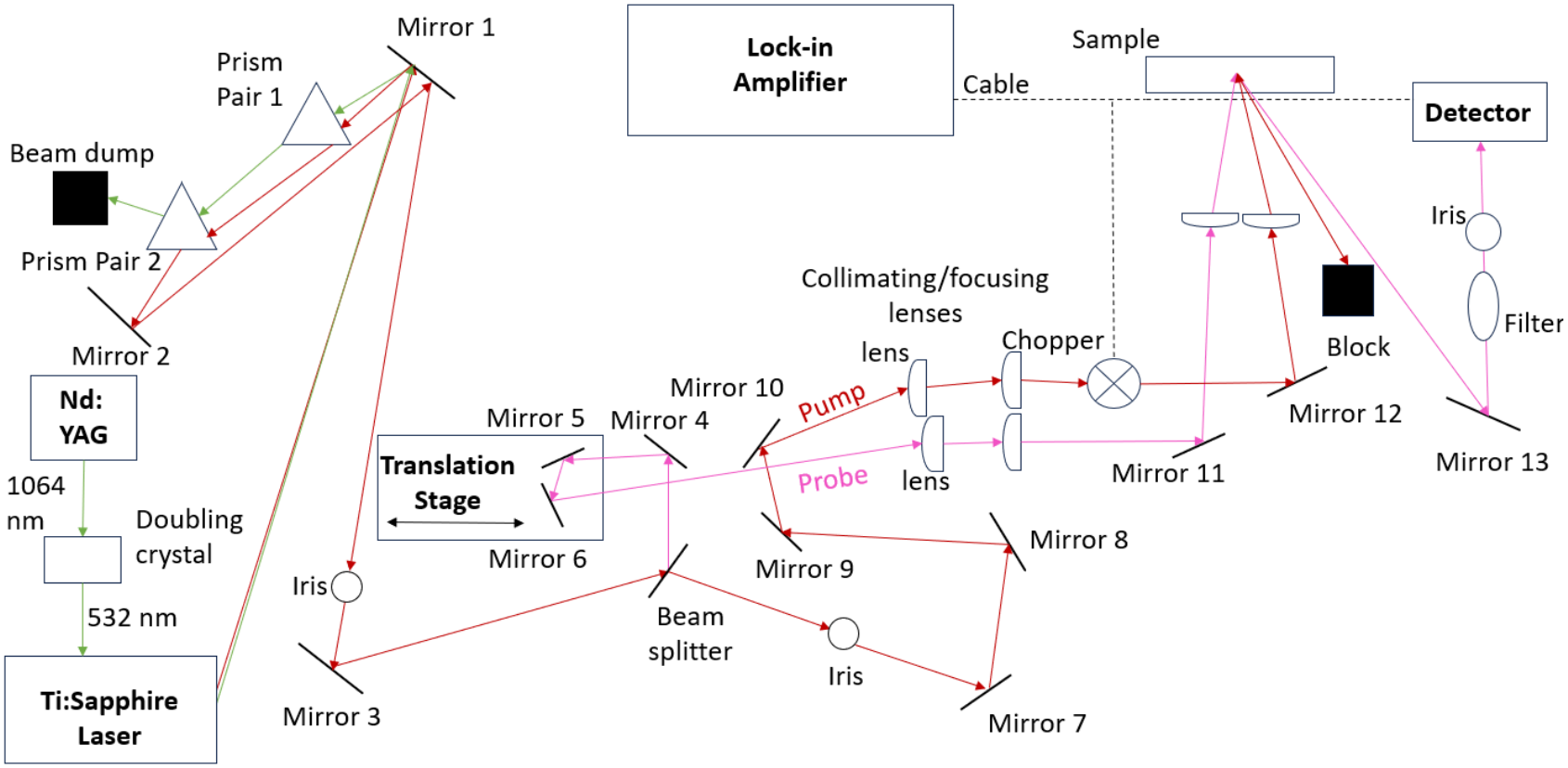
- Emco Concept 55 CNC Milling Machine
- Markforged Onyx 3D Printer
- Starrett Coordinate Measuring Machine (CMM)
- Einscan 3D Scanner
- Manufacturing Quality Assurance
- Amatrol Electronics Learning System
- Skill Boss Smart Factory

https://www.stonehill.edu/offices-and-services/leap-stonehill/

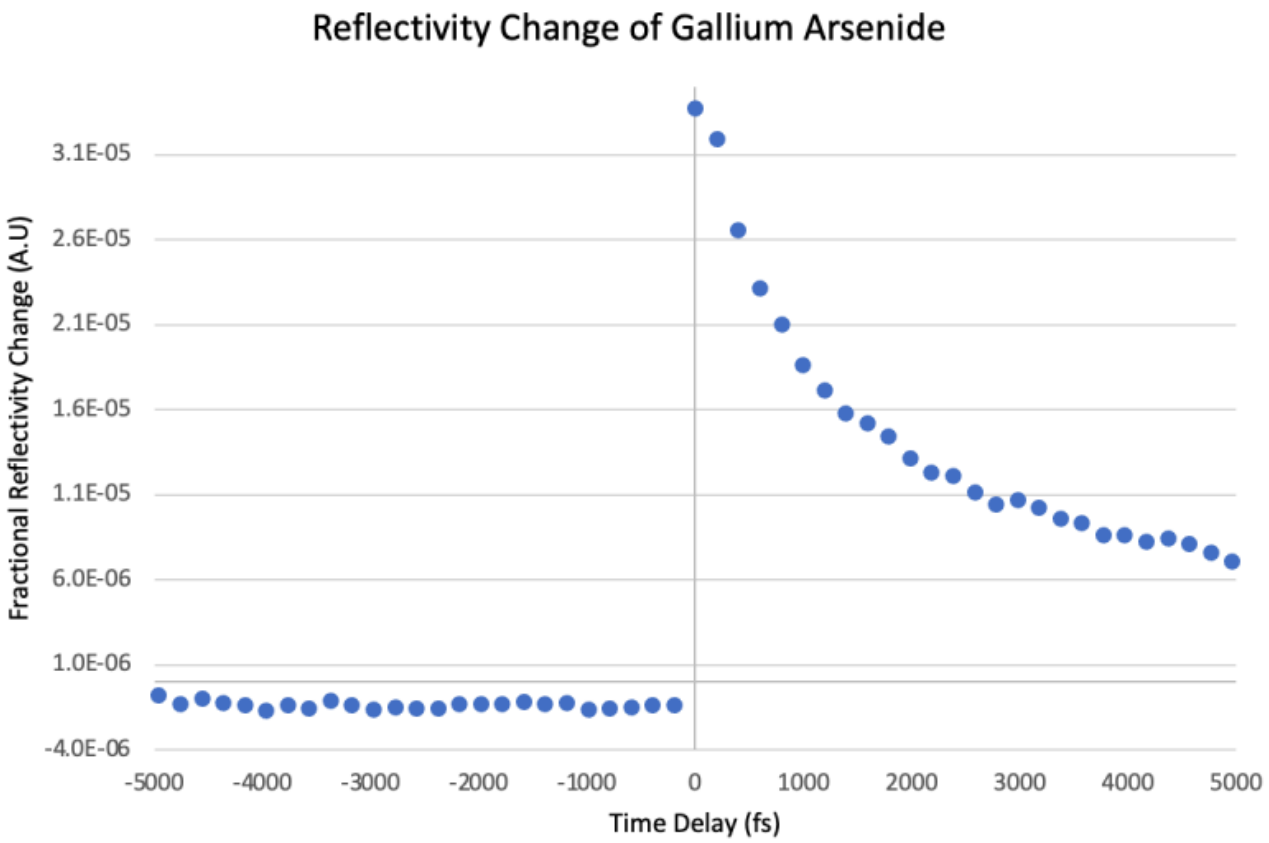
Photonics Lab LEAP@Stonehill: Facial Recognition Research Project



Ti:Sapphire Laser Lab: Transient Reflection Data on GaAs



Ti:Sapphire Laser Lab: Transient Reflection Data on GaAs



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Certificate

Major

LEAP

- Photonics & Optical Engineering Certificate
- Majors & Minors
- Lab Research
- stonehill.edu/photonics
- ***Any questions?***

Photonics Programs at Stonehill College: Bridging Education & Industry

Part of beautiful Stonehill College!