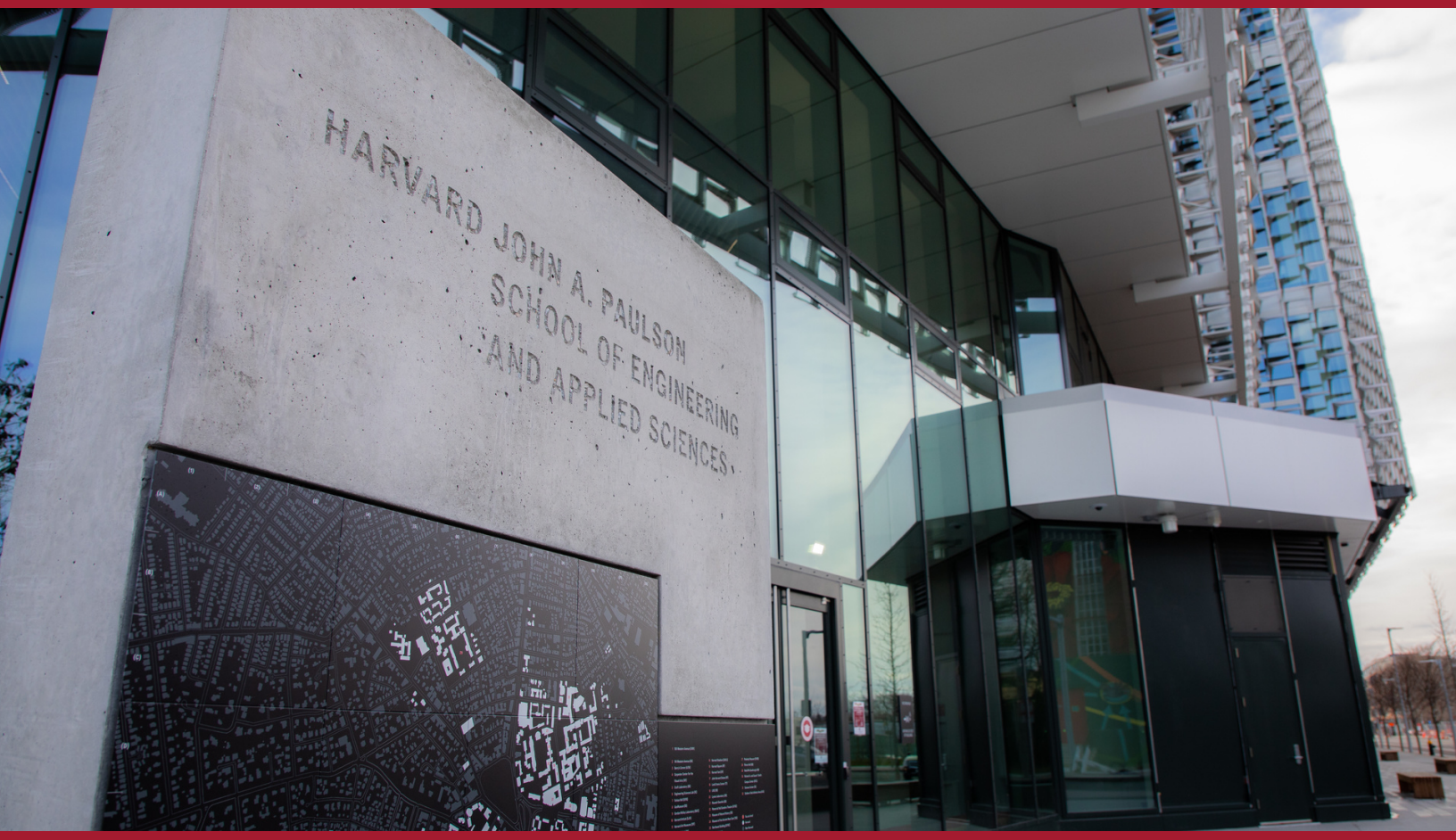
HARVARD SEAS

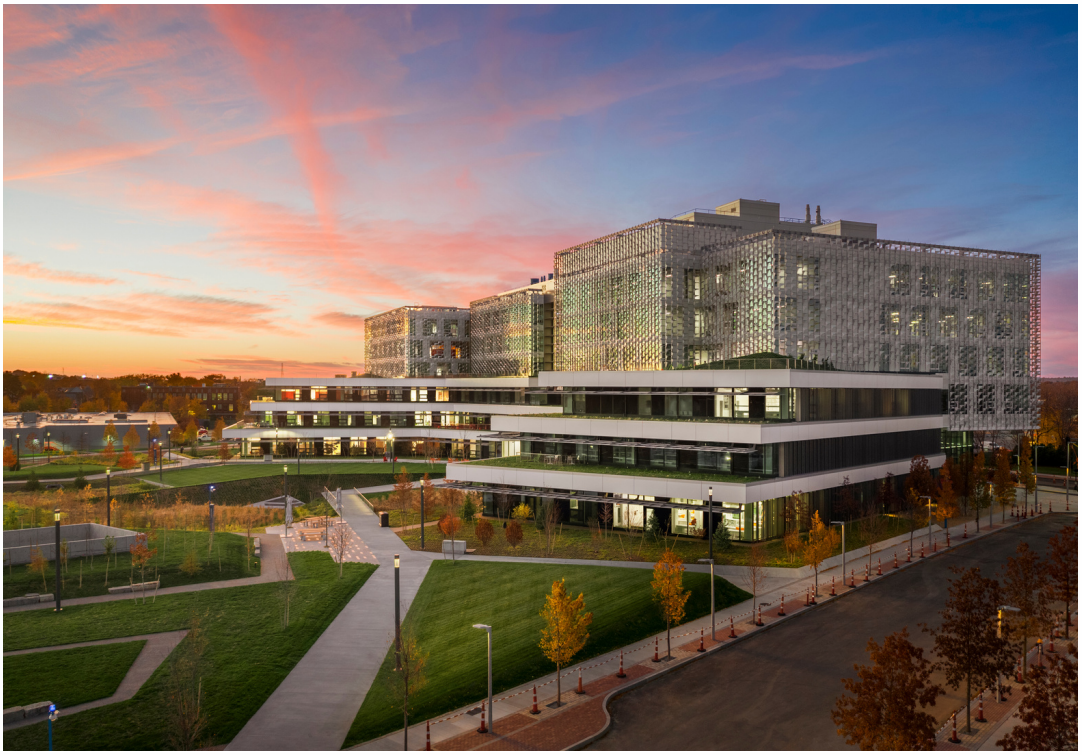
Research Cores @ the SEC

UPDATED MARCH 2023



sciops.seas.harvard.edu/

ABOUT THE CORES



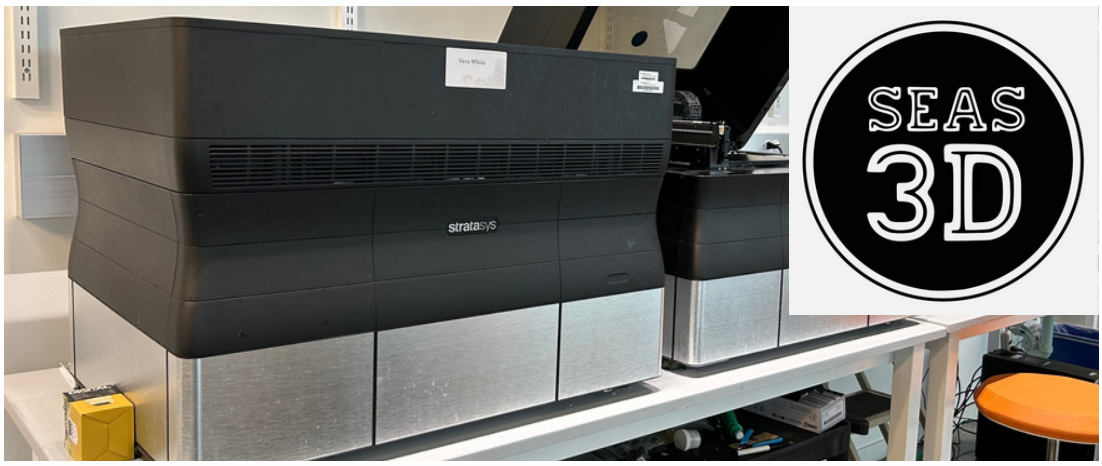
Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) seeks to enable innovative research and problem-solving which is facilitated through collaborative spaces and initiatives and by investing in resources that support our research community's interests, integrating science and engineering across fields and campuses.

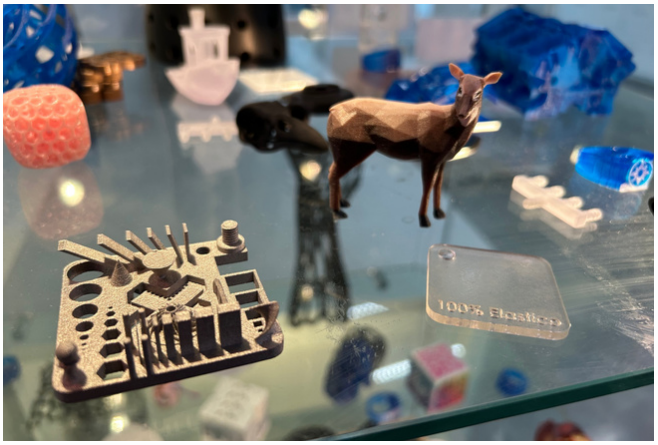
At the Allston campus, the Science and Engineering Complex (SEC), SEAS, in collaboration with the Faculty of Arts of Sciences (FAS), has established research cores to support the Allston campus and fellow researchers within and outside our community. The cores that are available to researchers internal and external to Harvard are listed below:

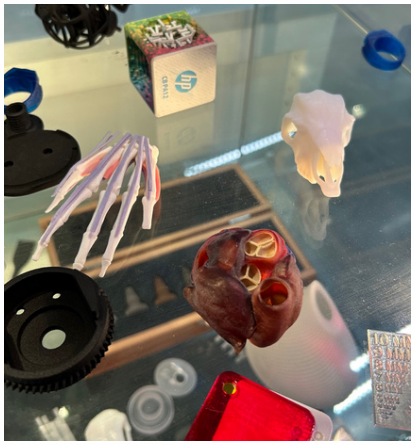
SEAS 3D Printing Core | SEC 2.121
SEAS Molecular and Cellular Biology Core | SEC LL2.232
HCBI Optical Imaging (Light & Fluorescence Microscopy) | SEC 2.124
CNS Material Characterization & Analysis | SEC LL2.226
CNS Soft Lithography | SEC 2.125
CNS Imaging & Analysis Suite (Electron Microscopy) | SEC LL2.301

Each core has their own onboarding and training process.
Please see each core section for more information.

SEAS 3D PRINTING CORE



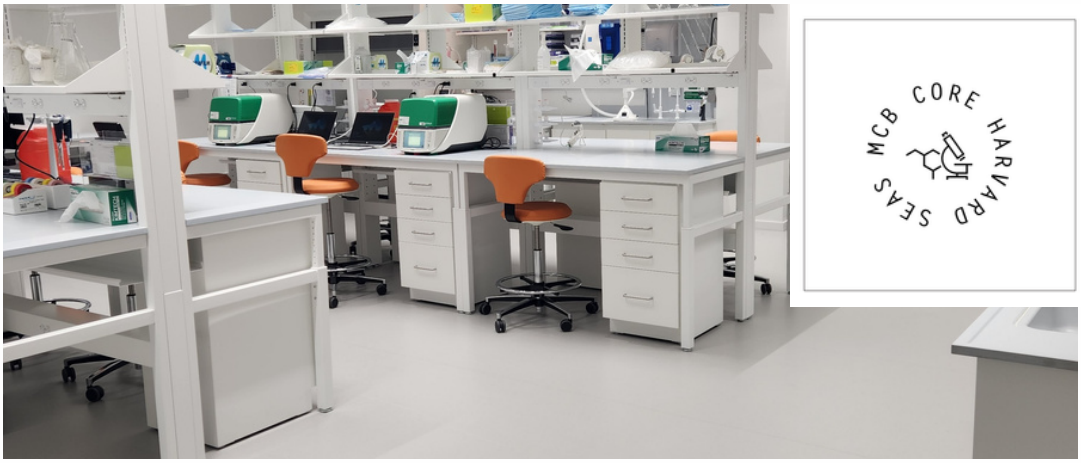




Engineering researchers in the Allston-SEC rely heavily on rapid prototyping tools. The mission of the 3D Printing Core is to primarily assist the Harvard research community in rapid prototyping, additive manufacturing, robust design, and high-quality part production.

Core Type: Full Service
Service: We provide design consultation, 3D modeling, material selection, and production.
How to become a user: Link
Price list: Link
Contact: Ted Sirota - tsirota@seas.harvard.edu

Technology Type	All PolyJet	VisiJet Clear (MultiJet)	Polylactic Acid (FFF)	Onyx (FFF)	High Temp (SLA)	Nylon 12 (SLS)
Build Volume	294 x 192 x 148.6 mm	290 x 200 x 140 mm	240 x 200 x 200 mm	310 x 130 x 150 mm	75 x 75 x 150 mm	160 × 160 × 300 mm
Resolution	50µm	25µm	200µm	100µm	100µm	110µm
Minimum Feature Size	250µm	100µm	300µm	300µm	300µm	250µm
Unique Properties	Very smooth surfaces. Ideal for mold making and PDMS Casting.	Multiple color, texture, and stiffness options. Great for "looks-like" prototypes.	Most affordable option. Best for early stage prototyping.	Stiffest material option. Great for mechanical components.	Can withstand temperatures of up to 140 °C without deflecting.	Physically Isotropic. Best option for high strength applications



SEAS MCB CORE

The Science and Engineering Complex's Molecular and Cellular Biology core provides access to biologically relevant resources including access to instruments, technologies, services, and expertise. The research core, with 1,800 sq. ft of research space, is committed to bolstering research capacities, enhancing and expanding collaborative capabilities, and accelerating discovery and translation by aiming to support and facilitate faculty, students, and staff in their research.

Core Type: User (self-use after training)
Service: Onboarding, equipment training, equipment maintenance and troubleshooting, facilitating service through vendors, ensuring compliance, developing and implementing standard operating procedures, and maintaining a clean and safe working environment. Equipment – some specific consumables are provided by the Core. We also help link to other Harvard cores as well as facilitate counseling services with vendor technicians.
How to become a user: Link
Price list: Link
Contact: Angie Greer - agreer@seas.harvard.edu

Characterization	Analytical	Basic Lab Equipment
Aurora Cell Analyzer	LC-MS	Lyophilizer
Western Blot	HPLC – Analytical	CO2 Incubators
Cryostat	HPLC – Prep	Biosafety Cabinets
Plate Reader	UV-VIS	Fume Hood
Nanodrop	GPC	Benchtop centrifuges
EVOS Microscope	GC-MS	Rotary Evaporator
RT-PCR		Fridge (4C) and Freezers (-20C)

Harvard Center for Biological Imaging

HCBI @ ALLSON

The HCBI @ Allston was designed to allow researchers in the SEAS facility access to the latest and best imaging technologies. The facility was designed to be an "Evergreen" microscopy facility with imaging systems leased rather than purchased and replaced every 2-3 years.

Core Type: User (self-use after training)
Service: Users are trained by dedicated imaging scientists and assisted in planning and conducting their imaging experiments as needed.
How to become a user: Link
Price list: Link All training and consultation time is free, but usage on the microscopes is charged.
Contact: Alex Lovely - alexander_lovely@fas.harvard.edu

Microscopes		Graphics Workstation**
LSM 900 Bio	Sensitive widefield fluorescence imaging. Can perform standard multicolor confocal imaging, spectral imaging and create patterned excitation for FRAP/optogenetics experiments.	Graphics Workstation 1: Deconvolution / Airyscan Processing
LSM 900 Materials	DIC, phase contrast, polarization, reflected light and fluorescence. Image in fluorescence or reflected light mode.	Graphics Workstation 2: Intellisis ML Segmentation
Axio Scan	100-slide capacity to perform polarized light imaging and image samples stained with both colorimetric, and fluorescent dyes.	** all workstations perform standard ZEN Blue functions (stitching, image export)

Center for Nanoscale Systems

Harvard University
FAS • SEAS

CNS is the Center for Nanoscale Systems, which is a part of the Faculty of Arts and Sciences (FAS) and SEAS at Harvard University. The Center for Nanoscale Systems provides three facilities at the Science and Engineering Complex (SEC) at Harvard's Allston campus.

(1) **CNS Material Characterization & Analysis** lab houses a diverse selection of instrumentation for analyzing hard and soft materials, including thermal, mechanical, surface, particle, and chemical characterization.
(2) **CNS Soft Lithography** facility is equipped for fabricating and replicating micrometer to nanoscale features using soft elastomeric materials, either through self-assembly or replica molding.
(3) **CNS Imaging & Analysis Suite (Electron Microscopy)** has two high resolution electron microscopes, along with an array of electron microscopy sample preparation tools for hard, soft and biological materials.

Core Type: User (self-use after training) or full service
Service: Users are trained by dedicated imaging scientists and assisted in planning and conducting their imaging experiments as needed. Users can also choose to have measurements taken for them - this is typically more expensive than self-user fees per hour.
How to become a user: Link
Price list: Link
Contact:
Material Characterization & Analysis | Nick Colella - colella@fas.harvard.edu
Soft Lithography | Jiten Narang - jnarang@fas.harvard.edu
Imaging & Analysis Suite (Electron Microscopy) | Adam Graham - agraham@cns.fas.harvard.edu and Nicki Watson - nwatson2@fas.harvard.edu

CNS @ THE SEC

Center for Nanoscale Systems

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CNS @ THE SEC

Imaging and Analysis

Electron Microscope	Sample Preparation Workflow and Training
Zeiss Gemini 360 FE-SEM (Scanning Electron Microscope), Cryo-SEM	A sample preparation area supports the electron microscopy work performed at the SEC. Sputter coating, carbon coating and plasma cleaning are available for preparation of SEM samples. A diamond wheel saw and polishing tool are helpful for making SEM and TEM samples from hard materials. Critical point drying can be used to dry soft and biological samples, and a glow discharge unit to prepare TEM grids. Sectioning can be performed using our room temperature and cryo ultramicrotome, while a fume hood is available for embedding and staining.
Hitachi 7800 TEM	
JEOL F200 TEM	
Leica Ultramicrotome	
Leica Cryo-Ultramicrotome	
Allied Polisher	
Allied Precision Low Speed Saw	When preparing biological specimens for transmission electron microscopy, every step of the procedure affects the quality of the final images. At CNS users can be trained on sample preparation methods for a variety or sample types. Negative staining is an established method for imaging the structure of proteins, single particles, and small organisms, by contrasting a thin specimen with an optically opaque fluid. Routine morphology allows for specially prepared samples to be sectioned and high resolution of cellular infrastructure can be examined. Immuno cyto chemistry allows for the localization of proteins with in mildly fixed material.
Fiscchione 1010 Dual Beam Ion-Mill	
Critical Point Dryer Tousimis 931 GL	
WMS 150T ES Sputter/Carbon Coater	
Pelco Easyglow	
Vitrobot	
Bal-tec Cryo Preparation	

Material Characterization

Dynamic Mechanical Analysis	Surface Analysis	Chemical and Particle Analysis	Thermal Analysis
Dynamic Mechanical Analysis Mettler Toledo DMA 1	Atomic Force Microscopy (AFM) JPK Nanowizard AFM	Horiba LabRam Soleil Raman Microscope	Thermogravimetric Analysis TA Instruments Discovery TGA 550.
Rheometry TA Instruments HR 20 Discovery Hybrid Rheometer	Bruker Optical Interferometric Profiler	DLS and Zeta Potential Malvern Zetasizer Pro	TA Instruments Discovery 250 Differential Scanning Calorimetry (DSC)
Bruker Nanoindenter	Electrical Characterization Signatone Probe Station	Thermo Scientific Nicolet iS-50 FTIR	
		Magritek Spinsolve 80 Carbon NMR	

Lithography

Diener plasma cleaner	Laurell spin coater
FlackTek speed mixer	stylus profiler
ABM mask aligner	Keyence optical microscope

Harvard John A. Paulson School of Engineering and Applied Sciences

WE INVITE YOU TO LEARN MORE!

Note all fees, onboarding processes, and access are subject to change and are core dependent.

SEAS SciOps

Core Managers

Ted Sirota - SEAS 3D Printing Core
Angie Greer - SEAS Molecular and Cellular Biology Core
Alex Lovely - HCBI Optical Imaging (Light & Fluorescence Microscopy)
Nick Colella - CNS Material Characterization & Analysis
Jiten Narang - CNS Soft Lithography
Adam Graham - CNS Imaging & Analysis Suite (Electron Microscopy)
Nicki Watson - CNS Imaging & Analysis Suite (Electron Microscopy)

Please visit https://sciops.seas.harvard.edu/research-cores-the-sec/ for up-to-date policies, pricing, and contacts.

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