



CENTRAL
STATE UNIVERSITY

Paid Intel Summer Internship for Women and Underrepresented Minorities

June 5-July 28, 2023

Wright State University Campus

Scholarships

\$5,000 stipend and food allowance

Paid housing at WSU campus

Online Application

<https://shorturl.at/xNo24>



Deadline: May 12

<https://intel-csu.github.io/>

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Program Overview

Welcome to the Intel-Sponsored Summer Internship Program, a collaborative initiative between Central State University (CSU), Wright State University (WSU), Intel, and the U.S. Air Force Research Laboratory. We are thrilled to present this program exclusively designed for undergraduate and high-school students from female and underrepresented minority backgrounds. Our primary goal is to engage and empower talented individuals from diverse communities, offering them a comprehensive learning experience in the field of microelectronics. By fostering essential skills and knowledge, we aim to prepare a skilled workforce in the semiconductor field that serves a candidate pool for future Intel job opportunities in Ohio.

Program Details

The Intel-Sponsored Summer Internship Program, offered by Central State University is being offered at the Wright State University Campus from June 5 to July 28 (8 weeks), is open to all students, with no prior experience in microelectronics necessary but requiring a basic understanding of high-school mathematics. <https://intel-csu.github.io>

Scholarship Benefits

Selected participants in the Intel-Sponsored Summer Internship Program will receive scholarship benefits, including a \$5,000 stipend and food allowance, as well as paid accommodation at WSU guest houses over the internship period.

Application Process

Online applications for the Intel-Sponsored Summer Internship Program were invited via the following application link with a deadline of May 12, 2023:

<https://shorturl.at/xN024>

Who Can Apply?

This program warmly welcomes all students who possess a basic understanding of high-school mathematics, regardless of their previous level of experience or knowledge in

microelectronics. We particularly encourage women and underrepresented minorities to seize this remarkable opportunity to explore the exciting world of microelectronics.

The internships will be offered at the Wright State University campus from June 5 to July 28, 2023. It is an intensive, mentored training program that will provide the interns with an opportunity to discover new possibilities, gain valuable skills, and embark on a rewarding journey towards a future in microelectronics.

Organizing Teams

Central State University Team

Dr. Mohammadreza Hadizadeh	ISEP-CSU grant Lead-PI
Dr. Mahmoud A. Abdallah	Chair of MFE Department; ISEP-CSU grant co-PI
Dr. Emdad Ahmed	ISEP-CSU grant co-PI
Dr. Abayomi J. Ajayi-Majebi	ISEP-CSU grant co-PI
Ms. Esther Cartwright	ISEP-CSU grant assistant
Ms. Tina A. Castonguay	Associate Director of OSP&R
Dr. Deng Cao	ISEP-CSU grant co-PI
Dr. Mubbashar Altaf Khan	ISEP-CSU grant co-PI
Dr. Morakinyo A.O. Kuti	Dean of JWGCESTA; ISEP-CSU grant co-PI
Dr. Arunasalam Rahunanthan	Chair of M&CS Department; ISEP-CSU grant co-PI

Wright State University Team

Dr. Subhashini Ganapathy	Chair and WSU Intel team lead
Dr. Fathi H.M. Amsaad	ADMETE grant PI; ISEP-CSU grant co-PI
Dr. Travis E. Doom	Associate Dean of CECS; ADMETE grant co-PI
Mr. Billy Kelley	ADMETE Lab Manager; PCB Fabrication & Design Instructor
Dr. Ahsan Mian	Additive Microfabrication of Electronics Instructor; Intel grant co-PI
Dr. Ivan Medvedev	Chair of Physics Department; ISEP-CSU grant co-PI
Ms. Sarah Napier	ADMETE grant manger
Dr. Ren Saiyu	Microelectronics Design & Security Instructor; ISEP-CSU grant co-PI
Dr. Daniel Sim	Microelectronics Fabrication Instructor; AFRL

ISEP-CSU: Intel Semiconductor Education Program at Central State University

ADMETE: Assured Digital Microelectronics Education and Training Ecosystem

Internship Curriculum & Program

Internship Schedule

During the internship program, the participants will engage in 1.5 hours of lectures and 1.5 hours of hands-on lab practice each day, from Monday to Friday. This immersive approach will provide the interns with a comprehensive understanding of microelectronics concepts and applications.

Schedule and overview of courses for the internship program, Summer 2023.

June 5 10:00–11:00	Registration
June 5-16	Introduction to Microelectronics Design
11:00–15:00	Dr. Saiyu Ren WSU saiyu.ren@wright.edu
June 19-30	Introduction to Microelectronics Security
11:00–15:00	Dr. Saiyu Ren WSU saiyu.ren@wright.edu
July 3-14	Introduction to Printed Circuit Boards Fabrication and Design
11:00–15:00	Mr. Kelley Billy WSU billy.kelley@wright.edu
July 17-21	Introduction to Microelectronics Fabrication
TBD	Dr. Daniel Sim Wright-Patterson AFB & WSU billy.kelley@wright.edu
July 24-28	Introduction to Additive Microfabrication of Electronics
11:00–15:00	Dr. Ahsan Mian WSU ahsan.mian@wright.edu
July 28 15:00–16:00	Certificates & Conclusion

First Day Agenda

- 09:30 – 10:00 Faculty Meeting in Atrium of Russ Engineering Center
- 10:00 - 10:45 Interns Registration
- 10:45 - 11:00 Facility / Labs / Classroom Tour
- 11:00 - 12:30 Introduction to Microelectronics Design with Dr. Ren
- 12:30 – 13:30 Lunch on your own (please refer to the brochure for local lunch options)
- 13:30 – 15:00 Introduction to Microelectronics Design Lab with Dr. Ren

Courses Outline

Introduction to Microelectronics Design

- Real-world analog signals and communications,
- Strengths and weaknesses of analog communications,
- Importance of Digital Signals and Microelectronics,
- Bridge components for analog and digital communications,
- Microelectronic device architecture and operating system,
- Digital number systems and conversions,
- Basic digital implementation technique, Basic Boolean algebra theory and logic gates, Basic digital arithmetic operations,
- Microelectronics vulnerability, security and counterfeit.

Introduction to Microelectronics Security

- Basic microelectronic circuit design, performance evaluation and measurement (delay, power, area, etc.),
- Use of industry standard design tools to create micro-chip level layout for fabrication including design checks and performance evaluations,
- Micro-chip fabrication process and clean room operation,
- Microelectronic supply chain system & Security risks:
 - Microelectronics vulnerability – Potential Security risk (Counterfeit microelectronics, Intellectual Property protection, data integrity, etc.),
 - Potential cyberattacks in each stage of the design/fabrication process (Hardware Trojans and side-channel attacks).

Introduction to Printed Circuit Boards Fabrication and Design

- Introduction to PCB fabrication,
- Introduction and demonstration of a basic microelectronic system on a printed circuit board,
- Difference between Printed Wiring Board (PWB) and PCB with examples,
- Introduction to chemicals and other material used in building PCB,
- PCB Types:
 - Single Sided (Single Layer) & Multi-Layer(Double Layer)
 - Importance of PCB in embedded systems in Industries like Intel and Air Force Research Lab,

- PCB Design process using CAD tool (KiCad, EDAA Cross Platform and other Open-Source Electronics Design Automation Suite like Proteus and Altium).

Introduction to Microelectronics Fabrication

This course will provide students with the basic physics and chemistry associated with microfabrication tools and techniques, and the fabrication of semiconductor devices. The following topics are covered in this course:

- Basic metallization, including thermal evaporation and plating,
- Wet-chemical processing, including metal lift-off, etch-back, and anisotropic deep etching,
- Annealing, wire bonding, and other contact technologies.
- Cleaving, dicing, and related chip generation,
- Lapping and polishing down to 100 micron or less (depending on the material) using diamond-grit and other slurries,
- Reactive-ion etching, including plasma ashing capability
- Sub-micron analysis and imaging capabilities using a Dektak profilometer, Rudolph ellipsometer, Infinity metallurgical microscope, or Phenom scanning electron microscope.

Microfabrication cleanroom training sessions will take place in the Microfabrication Science Cleanroom Facility, located within the Neuroscience Engineering Collaboration (NEC) Building. This facility features around 1100 square feet of space devoted to fabricating, packaging, and integrating semiconductor devices. The NEC Building houses a Class 1,000 cleanroom (835 SF) suitable for generic chemical processing and thin-film creation. It also accommodates a Class 100 cleanroom (260 SF) for basic photolithography down to approximately a 1.0-micron scale. This includes equipment for spinning, UV patterning (both flood and contact printing), and development.

Introduction to Additive Microfabrication of Electronics

- Introduction to additive manufacturing (AM) processes
 - Discuss all AM processes,
- Direct-write technologies for microfabrication
 - Nozzle dispensing: material extrusion,
 - Nozzle dispensing: Inkjet printing,
 - Nozzle dispensing: Aerosoljet printing,

- Additive manufacturing of electronics
 - Combination of 3D printing and direct write technologies to create structural electronics involving microelectronics devices, interconnects, finish electronic product,
 - For example, Additive Manufacturing can offers many advantages to companies in the electronics industry, including faster time to market, the manufacturing of full prototypes of pilot and small production series parts, and quickly implementing customer-specific solutions.

List of Participants

Name	Affiliation	Email Address
Aleyedeen Abdallah	High School Student	Tarek_abdallah@hotmail.com
Eva Arnold	Sinclair Community College	eva.arnold@sinclair.edu
Lily Braswell	High School Student	donna.braswell@wright.edu
Mye'sha Burnett	Central State University	mburnett.csu@centralstate.edu
Sharnelle Coicous	Central State University	scoicous.csu@centralstate.edu
Padma D. Doppalapudi	Wright State University	doppalapudi.5@wright.edu
Dana Dyer	Central State University	ddyer.csu@centralstate.edu
Jada Dyer	Xenia High School	dyerjc_2025@xeniaschools.org
Keithrelle Ferguson	Central State University	kferguson1.csu@centralstate.edu
Jeannie Fritz	Stark State College	jfritz0711@starkstate.net
Vandeleezza Hepburn	Central State University	vhepburn.CSU@centralstate.edu
Charles Hill	Central State University	chill.csu@centralstate.edu
Jonathan Katampe	Central State University	jkatampe.csu@centralstate.edu
Shaun'tel Martin	Central State University	Smartin.CSU@centralstate.edu
Jordan Olguin	Stark State College	jolguin0218@starkstate.net
Courtney Staley	Central State University	cstaley.csu@centralstate.edu
Imani Thompson	Central State University	lthompson.csu@centralstate.edu
Jaydon White	Central State University	jwhite9.csu@centralstate.edu
Deven Williams	Springboro High School	wdeven07@gmail.com
Derrick Wilson	Central State University	dwilson3.CSU@centralstate.edu

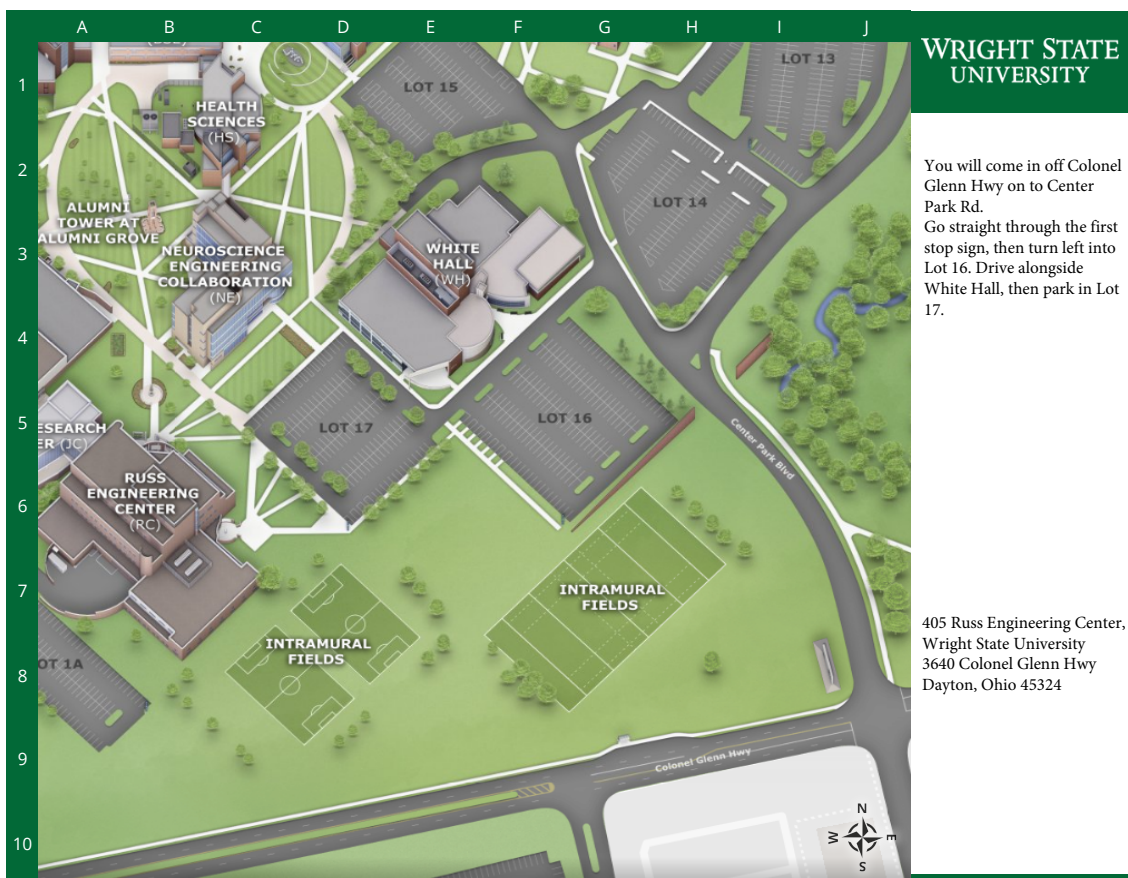
Useful Information

Internship Location

The internship is scheduled to be hosted at the RUSS Engineering Center, located on the campus of Wright State University.

- **Physical address:** 3640 Colonel Glenn Hwy, Fairborn, OH 45324.
- **Google Maps link:** <https://goo.gl/maps/nTPa76MzoBp5MGG37>

The following image provides an overview of the parking facilities at the RUSS Engineering Center.



Dining Options

As part of the internship program, you will have the flexibility to manage your own lunch arrangements. The University offers an excellent Dining Facility that you might want to consider. It provides a wide variety of foods and caters to various dietary preferences and restrictions. Here, you can enjoy a balanced meal and converse with fellow interns and even university students, which can potentially lead to enriching discussions and new connections. We recommend that you use this lunch period to not only satiate your hunger but also to immerse yourself in the community, make new friends, and enjoy your time here at Wright State University. If you'd prefer to step out, you have numerous options in the vicinity of the campus as well. There are a variety of local restaurants nearby, serving diverse cuisines.

- **On Campus Dining Options:**

- Student Union: 10am – 2pm
- Starbucks in Dunbar Library: 8am – 1pm

- **Off Campus Dining Options:**

- Tik's Thai Express LLC, 2808 Colonel Glenn HWY, Fairborn, OH 45324
- Rapid Fired Pizza, 2800 Colonel Glenn Hwy, Fairborn, OH 45324
- Hoshi Ramen, 2820 Colonel Glenn HWY, Fairborn, OH 45324
- Yaffa Grill, 2844 Colonel Glenn HWY, Fairborn, OH 45324
- El Rancho Grande, 3070 Colonel Glenn HWY, Fairborn, OH 45324
- Penn Station East Coast Subs, 3800 Colonel Glenn HWY 100, Fairborn, OH 45324

The organizers of the internship will arrange group lunches every Friday, which will be attended by all interns and instructors.

Remember, lunchtime is your own time - enjoy it as you wish!

WiFi Accesses

Free WiFi will be available during the internship. The WSU also provides access to an eduroam network.

- **WiFi: Public Domain (WSU_EZ_Connect)**

Housing at Wright State University

Check-in

WSU housing office is open Monday – Friday from 9am - 4pm.

The Hub | 2000 Zink Road Fairborn, OH 45324

When you arrive, we will need to verify your ID. Then, we will issue you your key packet which contains: a front door apartment key, your bedroom key and a mailbox key for your shared apartment mailbox.

Weekday After-Hours Check-In

If you are unable to check-in during normal office hours, please reach out to us immediately to arrange an after-hours arrival. Late arrivals can be accommodated by our on-call staff if coordinated in advance.

Weekend Check-In

We kindly request that plan to arrive between 9AM-9PM. Please give our on-call staff a courtesy text or call approximately 30 minutes to an hour before you arrive. They will meet you at your assigned apartment.

On-call staff | 937.409.0901

Parking

Parking permits must be purchased for all vehicles on campus. Please touch base with your coordinator to ensure a pass has been purchased for your vehicle. Parking passes can be purchased through the [Parking Pass Purchase Site](#).

Linens (if applicable)

Linens are an optional service, only available upon request. If you are interested in reserving linens, please reach out to guest housing staff for rate information. If you have reserved linens for your stay, they will be placed in your room. Upon your departure, please leave all linens in your room.

Of course, do not hesitate to contact us should you have any questions!

Residence Life & Housing

Wright State University | (937) 775-4172

housing_guest@wright.edu

wright.edu/residence-life-and-housing/guest-housing

Partner Institutions and Sponsors

The organizing teams of Intel's Summer Internship Program would like to extend their deepest thanks to Intel for their generous support and sponsorship of the Intel Semiconductor Education Program at Central State University ([ISEP-CSU](#)). Intel's dedication to promoting diversity and inclusion in the field of semiconductors has played a pivotal role in making this summer internship program a reality. Moreover, their generous gift of 50 FPGA boards is set to substantially enrich the hands-on learning experience of our participants and strengthen our educational initiatives. Special appreciation goes to the Program Directors for Intel University Research & Collaboration, [Ms. Melinda Murdock](#) and [Dr. Sowmya Venkataramani](#). Their expert guidance, ongoing support, and significant contributions have been invaluable in shaping the direction and success of our semiconductor program. We are incredibly grateful for their unwavering commitment and enthusiasm towards this initiative. Their efforts have helped in making this summer internship an enriching and transformative experience for all involved.

We would also like to thank the U.S. Air Force Research Laboratory (AFRL) for their support and partnership in creating the Assured Digital Microelectronics Education & Training Ecosystem ([ADMETE](#)) project. This Wright State University-led initiative is aimed at equipping the future workforce with essential skills and techniques in areas such as Design Assurance, Validation & Verification, Trust, Security, and Packaging to provide secure processing capabilities for entities such as the USAF, weapon systems, chip manufacturers like Intel, and ultimately, the entire U.S. nation. We extend special thanks to Mr. Kevin McCamey, the Team Lead and Program Manager at the Sensors Directorate and the Program Manager for ADMETE. His support has been invaluable to us.

We extend our sincere gratitude to [Dr. Steven Bibyk](#) for his invaluable support in the coordination of this summer internship. Additionally, we would like to express our deep appreciation to [Dr. Frank Fuller](#) and [Dr. Richard Hartmann](#) for their efforts in recruiting interns from Stark State College.

Furthermore, we want to acknowledge the dedication and efforts of Central State University and Wright State University in organizing and hosting this internship program. Their commitment to academic excellence and commitment to diversity has been vital in creating a supportive and inclusive environment for our interns.

Last but not least, we would like to extend our deepest gratitude to all the participants

of the summer internship program. Your enthusiasm, talent, and determination are the driving force behind the success of this initiative. We are glad that through this opportunity, we can mentor and guide you on your journey to success in the field of semiconductors.

Together, with the support of Intel, AFRL, and our partner universities, we are making significant strides in promoting diversity and empowering underrepresented individuals in the field of semiconductors. We look forward to witnessing your growth and achievements as you continue to make a positive impact in this exciting and rapidly evolving field.



