



# ADMISSIONS OPEN FALL 2024

## MS Electrical Engineering Specialization in Integrated Circuits (IC) & Systems



“A Training from Idea to Product Design”

Department of Electrical Engineering at FAST-NUCES ISB offers an MS program with expertise in Integrated Circuits and Systems. Pioneer and most mature IC Design MS program in Pakistan, student will do the real-world tape out from project conception to the working silicon microchip.

### WHY INTEGRATED CIRCUITS (ICs) DESIGN ?

- High demand for skilled IC designers in global 500 Billion \$ industry
- Recent IC design center established in the Public Sector Organizations.
- More than **six** IC startups in Pakistan over the last two years.

### WHY from FAST NUCES ?

- First and most established program in Pakistan having licensed Cadence tools suite and TSMC **28nm, 65nm, 130nm, & 180nm** PDKS.
- **8 graduate level courses** purely related to IC Design, covering all domains of IC Design from Analog, Digital, Mixed Signal.
- All of the MS ICD batches have 100% employment track record.
- **More than 200 hours training of graduates on Cadence Tool Suite.**
- Program tailored to train engineers in **2 semesters for Semiconductor Industry entry.**
- Proven track record of **more than a dozen fabricated graduate projects** in Pakistan with three graduate student batches.
- **International collaboration with Si-Valley company.**
- **Active collaboration with International Universities.**

### Feedback from Alumni and Industry

- The courses were specifically designed to provide the students with a strong knowledge of electronics and IC design skills. **(Dr. Nasir, Sr Director, NECOP)**
- This program is perfect for Engineers seeking in-depth training from concept to tape-out in analog and digital IC design. **(Aziz ur Rehman GM, NECOP)**
- One thing I must say! After working with the faculty, if you put your whole effort too, you will be a practical Chip designer. **(Hamza Saleem, MS IC)**
- The program offered me a variety of skills including design, plan, management, economy, and art of designing practical Integrated circuits, **(M Usman, MS IC)**

### Teaching and Technical Staff

**Prof. Dr. Rashad Ramzan**  
M.S. Royal Institute of Technology  
Stockholm, Germany  
Ph.D. Linkoping University, Sweden  
Professor at Department of  
Electrical Engineering  
FAST, NUCES, ISB.

**Dr. Hassan Saif**  
M.S. & Ph.D. Sungkyunkwan  
University, South Korea.  
Asst. Professor at  
Department of Electrical  
Engineering  
FAST, NUCES, ISB.

**Engr. Aqsa-Ehsan**  
MS EE  
Design Engineer  
FAST, NUCES, ISB.

**Engr. Fari-ud-Din**  
Lab Engineer  
FAST, NUCES, ISB.

### HOW TO APPLY

- Apply Online at
  - <http://admissions.nu.edu.pk>
  - Or Scan QR Code

- For more details about MS IC design
- and our research group please visit  
<http://isb.nu.edu.pk/rfcs2/>  
Info: [hassan.saif@nu.edu.pk](mailto:hassan.saif@nu.edu.pk)

**Application Deadline: 30 June 2024**



SCAN ME

### PROGRAM AND COURSES OUTLINE

#### Integrated Circuits Master's Program

Semester-1 Fall 2024	Semester-2 Spring 2025	Semester-3 Fall 2025	Semester-4 Spring 2026
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1. Research Methodology  
2. Digital Integrated Circuits  
3. Analog & DTICs  
4. Elective-I

1. Mixed Signal IC  
2. Elective-II  
3. Elective-III  
4. Elective-IV

1. MS Thesis/ Project (Part 1)  
or  
3. ElectiveV  
4. Elective-VI

1. MS Thesis/ Project (Part 2)

2 Semester (Morning Program) On-Campus  
Course Work (Aug-2024 to June-2025)

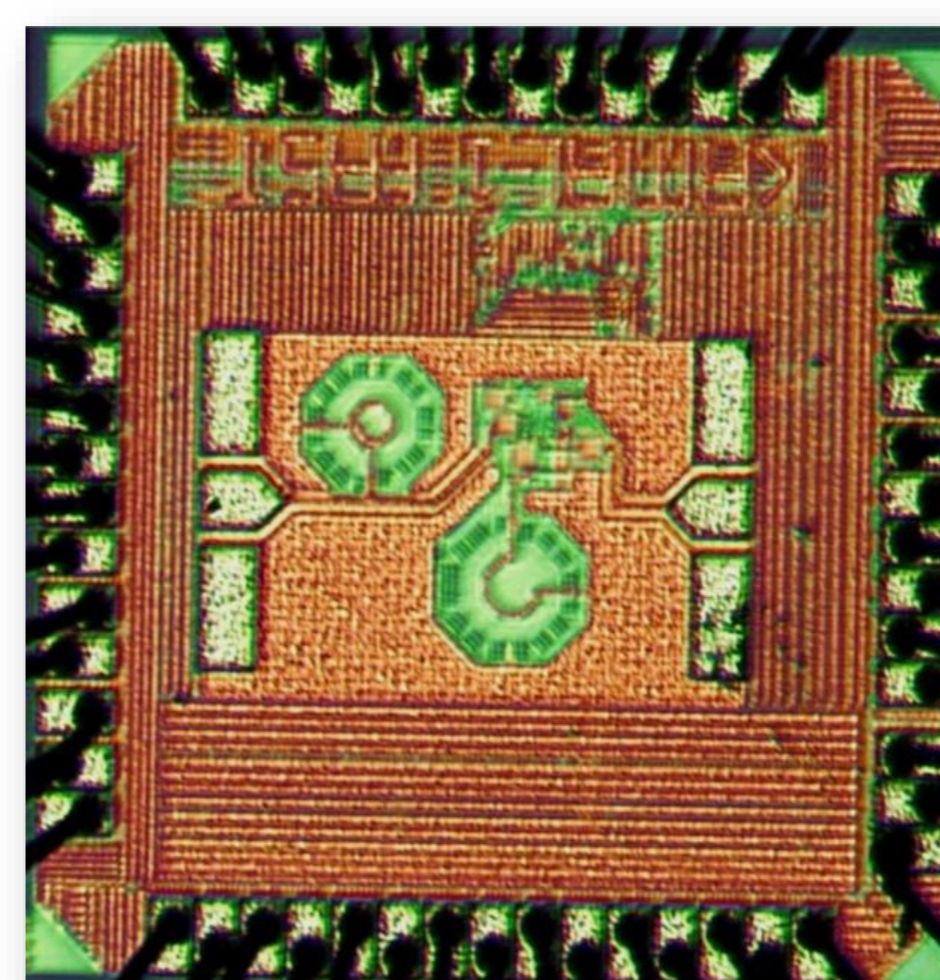
**Students Free to Join Industry:**  
**Option-1:** Opt industrial project. No campus visit  
**Option-2:** Opt thesis, 8-16 hours/week on-campus  
**Option-3:** 6 credit course work (Degree completion in 3 Semesters).

**Note: Electives are selected depending on the type of specialization i.e. Analog, Digital, RF or verification.**

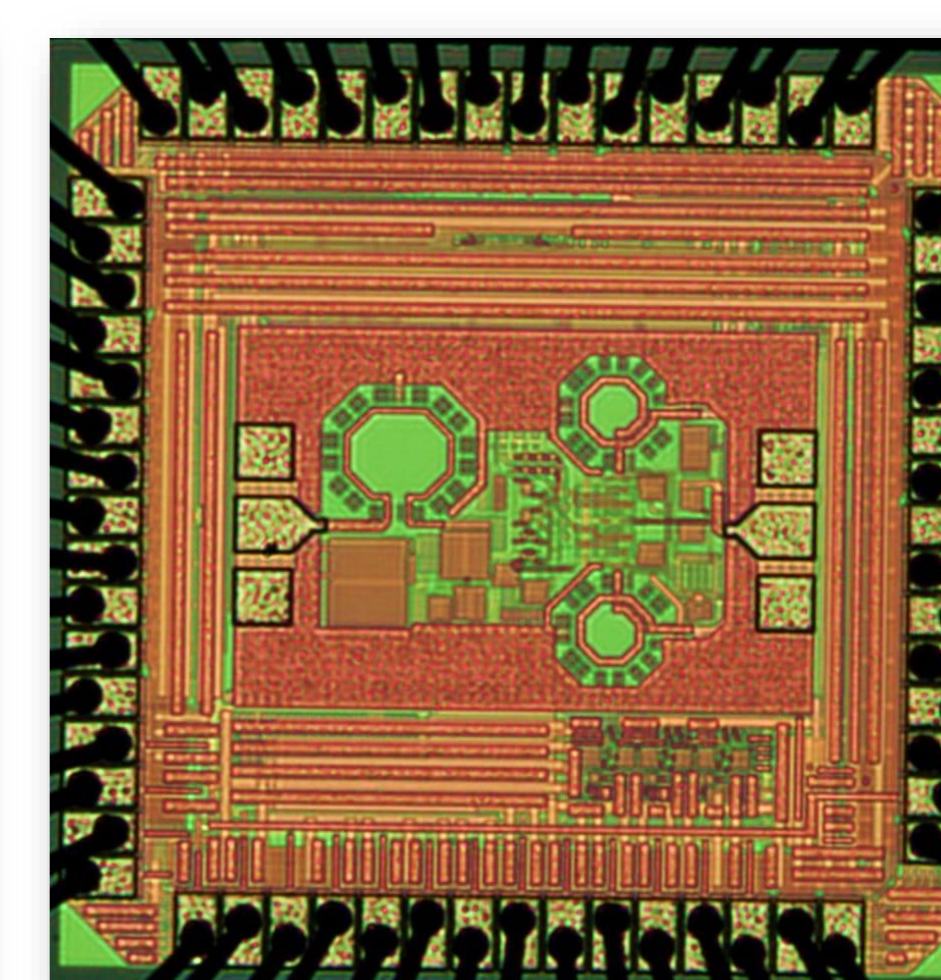
### 20 Graduate Students Tapeout Projects (Sessions 2021, 2022, & 2023)

#### TSMC 65nm Tapeouts 2021

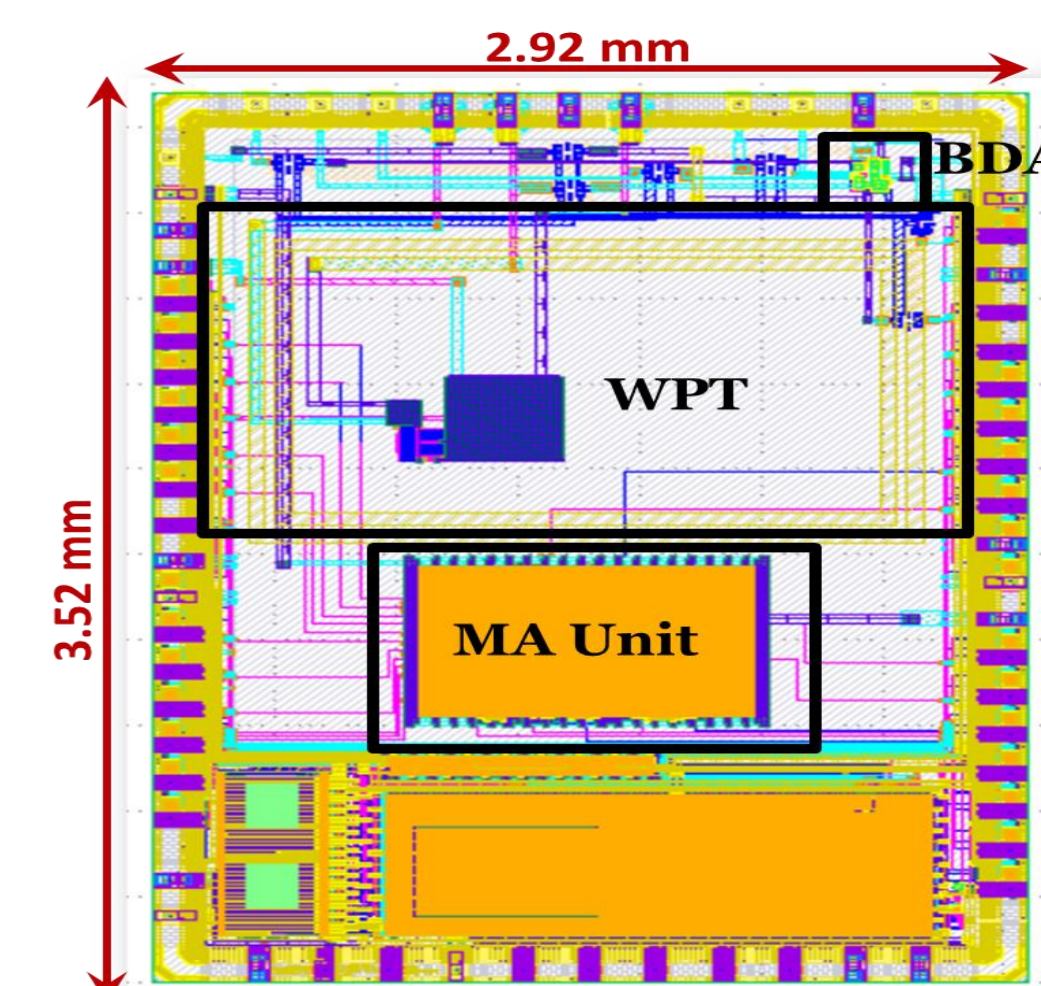
Kamal-1



Kamal-2

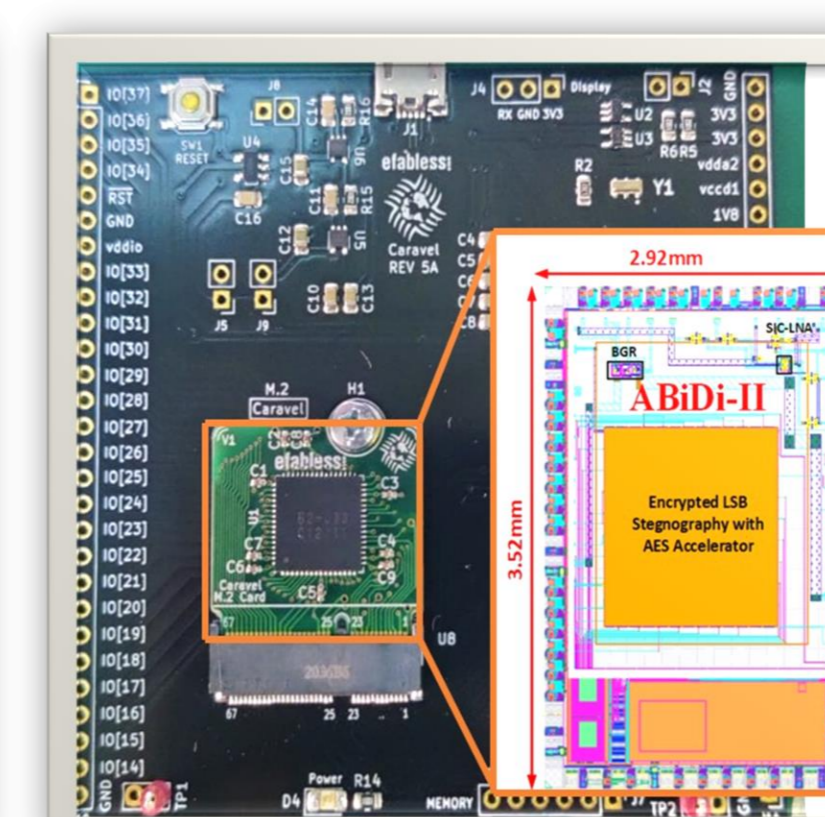
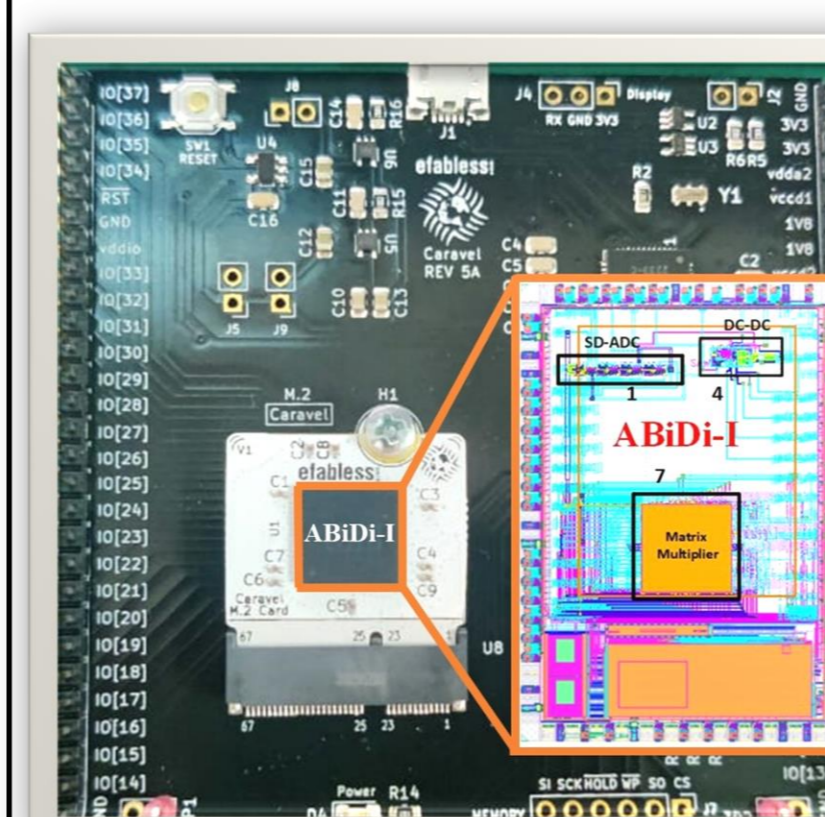


#### PICO 130nm Tapeouts 2021



- 1) Approximate ALU, 2) mm-Wave LNA, 3) Triboelectric Energy Harvester, 4) AC Logic,
- 5) mm-Wave Phase Shifter, 6) Sigma-Delta ADC 7) True Random Number Generator,
- 8) Configurable Logic Block, 9) Bi-Directional Amplifier, 10) WPT, 11) Multiply-Add Unit

#### PICO 130nm Tapeouts Nov, 2022



#### PICO Accepted Tapeouts 2023

Name	Affiliation	Project Title
Jurbeom Park	SNL South Korea	10-Bit 100-MHz Current-Steering DAC using IEEE SSCS Open-Source Tools
Aya Khalaf	Egypt	Current steering DAC
Gabriel Maranhão	Universidade Federal de Santa Catarina, Brazil	Analog blocks
Akira Tsuchiya	The University of Shiga Prefecture, Japan	Development of Process Portable Design Automation for Analog Circuits
Nouman Ahmad	National University of Computer Emerging Sciences, Pakistan	CURRENT STEERING DIGITAL TO ANALOG CONVERTER
Juan Sebastian Moya Bengoso	Universidad Industrial de Santander	11-bit differential ADC SAR
Jorge Marin	Universidad Tecnológica Santa María, Chile	PMAC for lab bench-on-chip
Jorge Marin	Universidad Tecnológica Santa María, Chile	12-bit SAR ADC design for a lab bench-on-chip
Muhammad Husein	National University of Computer Emerging Sciences, Pakistan	Phase Locked Loop Based Tunable Clock Generator for ADC and DAC
Muhammad Yousof	FAST National University, Pakistan	Scope MuX and Signal Conditioning
Nouman Iqbal	National University of Computer and Emerging Sciences, Pakistan	12-BIT PIPELINE ANALOG TO DIGITAL CONVERTER (ADC)
Muhammad Umar	FAST National University, Islamabad, Pakistan	ARBITRARY WAVEFORM GENERATOR MIX AND SIGNAL CONDITIONING
Muhammad Abbas	National University of Computer and Emerging Sciences, Pakistan	A Low Phase Noise Tunable Differential Clock Generator

### ELIGIBILITY

- Bachelor from PEC recognized University in: **(Min CGPA=2.5)**
  - Electrical/Electronics Engineering
  - Mechatronics Engineering
  - Telecommunication Engineering
  - Computer Engineering

### Scholarships Criteria

- **Selection Procedure**
- Step1:** NUCES MS EE Admission Test  
**GAT or GRE are not valid for MS ICD program**
- Step2:** NUCES, Islamabad IC Design Lab Test/Interview