

Computer Engineering @ ECE, UNM



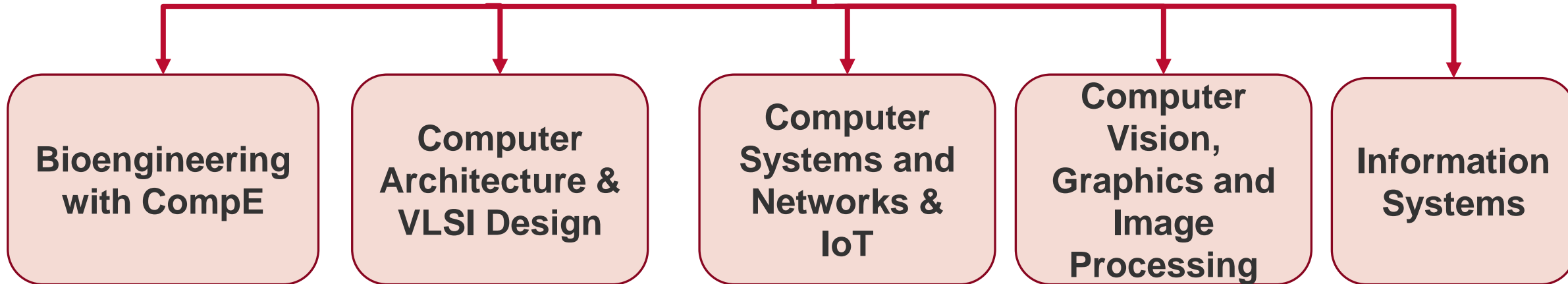
Welcome to UNM!

Computer Engineering Area – Structure



Dr. Eirini Eleni Tsiropoulou

Computer Engineering



Dr. Marios Pattichis



Dr. Jim Plusquellic



Dr. Eirini Eleni Tsiropoulou



Dr. Marios Pattichis



Dr. Manel
Martinez-Ramon

Step 1 – Identify your interests

I am not sure what I like the most?

- What should I do?
 - Talk to the faculty members of CompE
 - Read the description of the emphasis areas: <https://ece.unm.edu/graduate/research-emphasis.html>
 - Select some courses that will give you depth and breadth

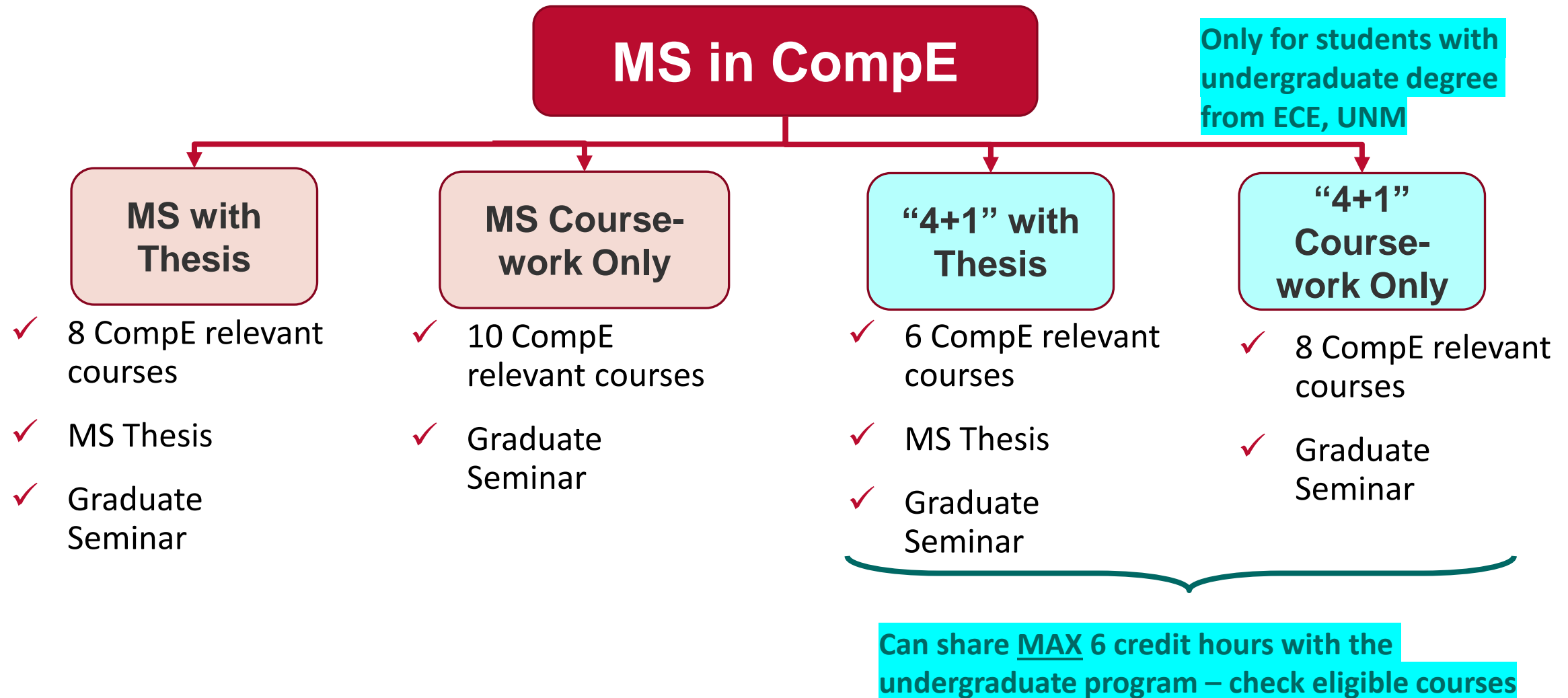
Example



Computer Systems and Networks

Computer networks are ubiquitous now. This emphasis is designed to prepare students for dynamic careers in the field of computer networks and distributed systems. A set of core courses are focused on advanced topics to allow students to build expertise in areas of fundamental cores of Internet and distributed systems, next generation mobile networks (5G and beyond), distributed decision making based on artificial intelligence, network economics, edge/fog/cloud computing, high performance computing system, high performance networking and computing, multimedia and wireless networks, communications protocols, peer-to-peer systems, distributed storage and transactions, resource management, system security, performance measurement and tuning, and various distributed applications.

MS in Computer Engineering



Step 2 – Select a path closer to your interests and goals!

Where can I find the CompE relevant courses?

Here: <https://ece.unm.edu/graduate/research-emphasis.html>

1. Select the sub-area that you are interested in
2. Identify the courses that you are interested in

You are all set!

✓ **And then?**

- A. If you are an **MS Thesis-path** student, contact your research advisor to approve the courses
- B. If you are an **MS Course-work only** student, contact the CompE Area Chair (Dr. Eirini Eleni Tsiropoulou, eirini@unm.edu, Office: 326B, Phone: 505-277-5501) to approve the courses

✓ **What do you mean “approve the courses”?**

- I. You need to download the form: <https://ece.unm.edu/graduate/current-students.html> and fill it in with your information, send it to your research advisor or the CompE Area Chair for signature and approval. Set up an appointment every semester with your research advisor or the CompE Area Chair to further discuss and get advice.

Step 3 – Select courses!

Ph.D. in Computer Engineering

- Similar steps:
 - Choose your Ph.D. advisor and topic
 - Discuss the courses selection with your Ph.D. advisor
 - More information here: <https://ece.unm.edu/graduate/phd-program/index.html>



Bioengineering with Computer Engineering

Related Courses:

- 510 Medical Imaging (Fall 2021)
- 516 Computer Vision (Fall 2021)
- 517 Machine Learning (Fall 2021)
- 533 Digital Image Processing (Spring 2022)
- 506 Optimization Theory (Fall 2022)
- 539 Digital Signal Processing (Spring 2022)
- 541 Probability Theory and Stochastic Processes (Fall 2021)

Faculty Members

- Marios Pattichis – *Area Chair*
- Manel Martinez-Ramon
- Balu Santhanam

Active Research:

- Computer-Aided Diagnosis
- Medical video communications
- Large-scale video analytics
- Medical image and video analysis:
 - Multiple-sclerosis
 - Stroke risk assessment
 - Brain image analysis
- FPGA, CPU, and GPU implementations of the Radon Transform

Computer Architecture & VLSI Design

Related Courses:

- 538 Advanced Computer Architecture (Fall 2021)
- 525 Hardware-Oriented Security and Trust (Spring 2023)
- 522 Hardware-Software Codesign with FPGAs (Fall 2022)
- 520 VLSI Design (Spring 2022)
- 338/595 Intermediate Logic Design (VHDL on FPGAs (Fall 2021)
- 540 Advanced Networking Topic (Fall 2021)
- 524 Network Economics (Spring 2022)
- 551/651 Problems (any Fall/Spring)
- 599 Master's Thesis (any Fall/Spring)

Faculty Members

- Jim Plusquellic – *Area Chair*
- Payman Zarkesh-Ha
- Lei Yang
- Marios Pattichis
- Eirini Eleni Tsiropoulou

Active Research:

- Physical Unclonable Functions
- Dynamic Partial Reconfiguration in FPGAs
- Low Power FPGA Systems
- FPGA Accelerated Algorithms
- FPGA Hardware Security
- RISC-V Microprocessor Fault Analysis on FPGAs
- Strategies to make FPGAs Reliable
- Hardware Trojan Circuit Detection
- Differential Power Analysis Countermeasures
- Analytical Modeling of Interconnect Failure in Nanometer VLSI Technologies

Computer Systems & Networks & Internet of Things

Related Courses:

- 440 Introduction to Computer Networks (Spring 2022)
- 506 Optimization Theory (Fall 2022)
- 517 Machine Learning (Fall 2021)
- 522 Hardware/Software Codesign with FPGAs (Fall 2022)
- 524 Network Economics (Spring 2022)
- 525 Hardware Oriented Security & Trust (Spring 2023)
- 537 Foundations of Computing (Fall 2021)
- 540 Advanced Networking Topics (Fall 2021)
- 541 Probability Theory and Stochastic Processes (Fall 2021)
- 551/651 Problems (any Fall/Spring)
- 599 Master's Thesis (any Fall/Spring)

Faculty Members

- Eirini Eleni Tsiropoulou – *Area Chair*
- Michael Devetsikiotis
- Ramiro Jordan
- Marios Pattichis
- Jim Plusquellic
- Xiang Sun
- Lei Yang

Active Research:

- Artificial Intelligence
- 5G/6G Networks
- Cybersecurity
- Blockchain & Cryptocurrency
- Smart Grid Networks
- Mobile Edge Computing
- Public Safety Networks
- Quality of Experience in Networks
- Hardware Security & Trust
- Embedded Systems
- FPGAs
- Green Communications & Computing
- Data Center Networks

Computer Vision, Graphics and Image Processing

Related Courses:

- 516 Computer Vision (Fall 2021)
- 517 Machine Learning (Fall 2021)
- 533 Digital Image Processing (Spring 2022)
- 506 Optimization Theory (Fall 2022)
- 539 Digital Signal Processing (Spring 2022)
- 541 Probability Theory and Stochastic Processes (Fall 2021)

Faculty Members

- Marios Pattichis – *Area Chair*
- Ramiro Jordan
- Manel Martinez-Ramon
- Balu Santhanam
- Lei Yang

Active Research:

- Image and video analysis
- Bilingual speaker and speech processing using audio and video data (Spanish+English)
- Video compression and communications
- GPU, FPGA, and CPU architectures for image and video processing (2D convolutions, Radon Transform, Max pooling, Deep Learning)
- Software methods for image and video analysis
- STEM+C education using image and video representations

Information systems

Related Courses:

- 500 Theory of Linear Systems (Fall 2021)
- 506 Optimization Theory (Fall 2022)
- 517 Machine Learning (Fall 2021)
- 524 Network Economics (Spring 2022)
- 537 Foundations of Computing (Fall 2021)
- 539 Digital Signal Processing (Spring 2022)
- 541 Probability Theory and Stochastic Processes (Fall 2021)
- 545 Introduction to Quantum Information Science (Fall 2022)
- 547 Quantum Error Correction (Spring 2022)
- 549 Information Theory and Coding (Spring 2022)
- 542 Digital Communications Theory
- 642 Detection and Estimation Theory

Active Research:

- Machine learning theory
 - Deep learning
 - Statistic learning theory
- Applications of machine learning:
 - Energy forecast for Smart Grid
 - Smart appliance scheduling
 - Communications
 - Cyber physical systems
 - Particle accelerators optimization

Faculty Members

- Manel Martínez-Ramón– *Area Chair*
- Tameem Albash
- Sudharman Jayaweera
- Milad Marvian
- Balu Santhanam
- Eirini Eleni Tsiropoulou

Thank you!

Eirini Eleni Tsiropoulou

Performance and Resource Optimization Laboratory

Department of Electrical & Computer Engineering

University of New Mexico

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The slides will be available

- Here: <http://ece-research.unm.edu/tsiropoulou/Teaching.html>