

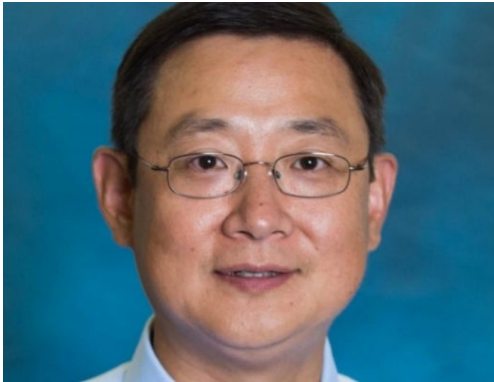


# Opportunities We Offer

Department of Informatics and  
Networked Systems  
Admitted Students Day

For students first enrolling in Fall 2024

# Hosts



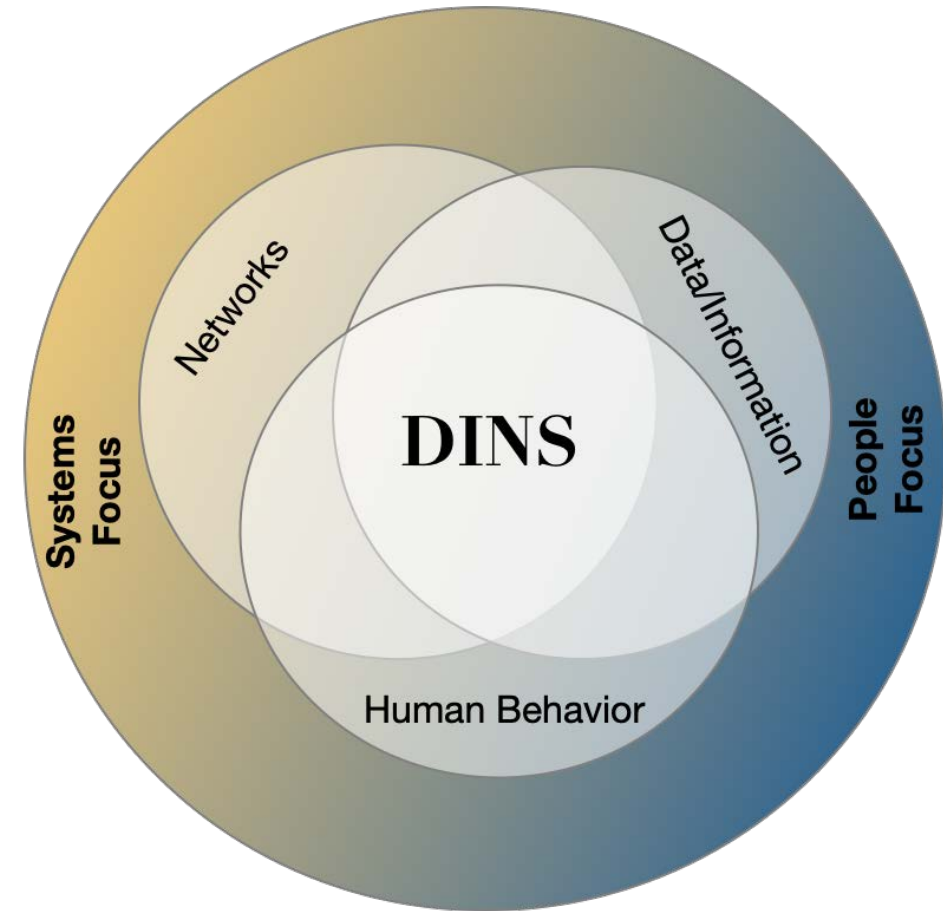
**Daqing He**  
Professor and Chair



**James Petraglia**  
Graduate Support Administrator

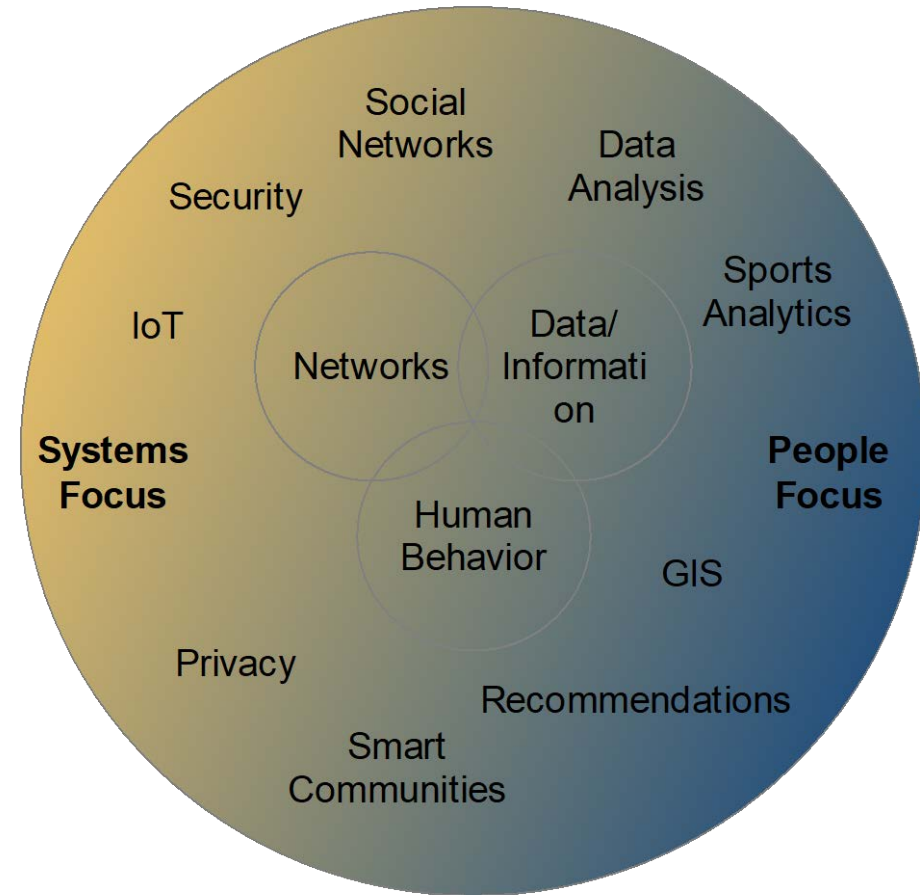
# Dept of Informatics and Network Systems

- *We call ourselves DINS*
- **Mission:**
  - To innovate in education and research at the junction of information, networks, and human behavior towards the discovery and modeling of new social and technical phenomena



# Dept of Informatics and Network Systems

- We are dedicated to:
  - Producing information professionals with right skills for the future
  - Undertaking leading-edge research and introduce students at all levels to research
  - Offering innovative learning opportunities
  - Fostering an interdisciplinary perspective to address real-world challenges



# Our Community's Diversity

- Students from different academic, cultural, geographic background
  - undergraduate degrees: Information Science, Computer Science, Computer Engineering, Electrical Engineering, Industrial Engineering, Psychology, Physics, Geology, Business Administrative Justice, Library Science, Chemistry, Math, Biology, French, Forestry, ...
  - Home countries: China, Chile, India, United States, Saudi Arabia, Taiwan, Brazil, Korea, Ghana, Italy, Indonesia, ...
  - Career paths: directly from undergraduate programs, after an industry career, even from other graduate degree programs!

DINS is proud to provide an environment that is challenging and interesting, one which broadens perspectives and understanding of how technology can serve humanity.

# Our Faculty

- World class researchers in their fields
- Different academic backgrounds
  - Computer science, information science, Engineering, Intelligent Systems, Psychology, Physics
- Industry Experience
  - Bell Labs, Singer-Link, IBM, UPMC, etc.
- Funded by
  - NSF, NIH, NIST, DARPA, US Air Force, ...
  - Richard King Mellon, Heinz, Alfred P. Sloan
  - Amazon, Meta, Google, UPMC



# Research Expertise in DINS

- Humans and Society
  - AI Adaptive web systems, learning technologies
  - Human-robot interaction, human centered computing
  - Spatial informatics, smart cities, urban computing
- Data and Information
  - Big data, data fusion, cloud computing, data visualization,
  - social computing, science of science, team collaborations, future of work
- Network and Systems
  - Cybersecurity and privacy, Resilient systems
  - wireless systems, sensor networks, IoT
  - Quantum computing

# Example Research Projects in DINS

- **Building a sustainable national network for developing and disseminating sports content**
  - NSF, Kostas Pelechrinis
- **Severe Impact Resilience: Framework for Adaptive Compound Threats**
  - Alion Science and Technology, Amy Babay
- **Efficacy of self-advocacy serious game intervention for women with advanced cancer**
  - NIH, Dmitriy Babichenko
- **Black Girls as Creators: an intersectional learning ecosystem toward gendered racial equity in AI education**
  - NSF, Angela Stewart
- **Human Emotion Regulation during Human-AI Interaction**
  - Honda Research Institute, Na Du



# Our Masters Programs

<b>MS in Information Science (MSIS)</b>	<b>MS in Telecommunications (MST)</b>
MSIS focuses on artificial intelligence, data science, web information systems, human centered computing, security and privacy, and networks and distributed systems (36 credits)	MST is focused on computer and telecommunication networks, cybersecurity, distributed systems and IoT (37 credits)
Both are Professional degree programs: Combines theory and hands-on activities, appropriate to professional practice	

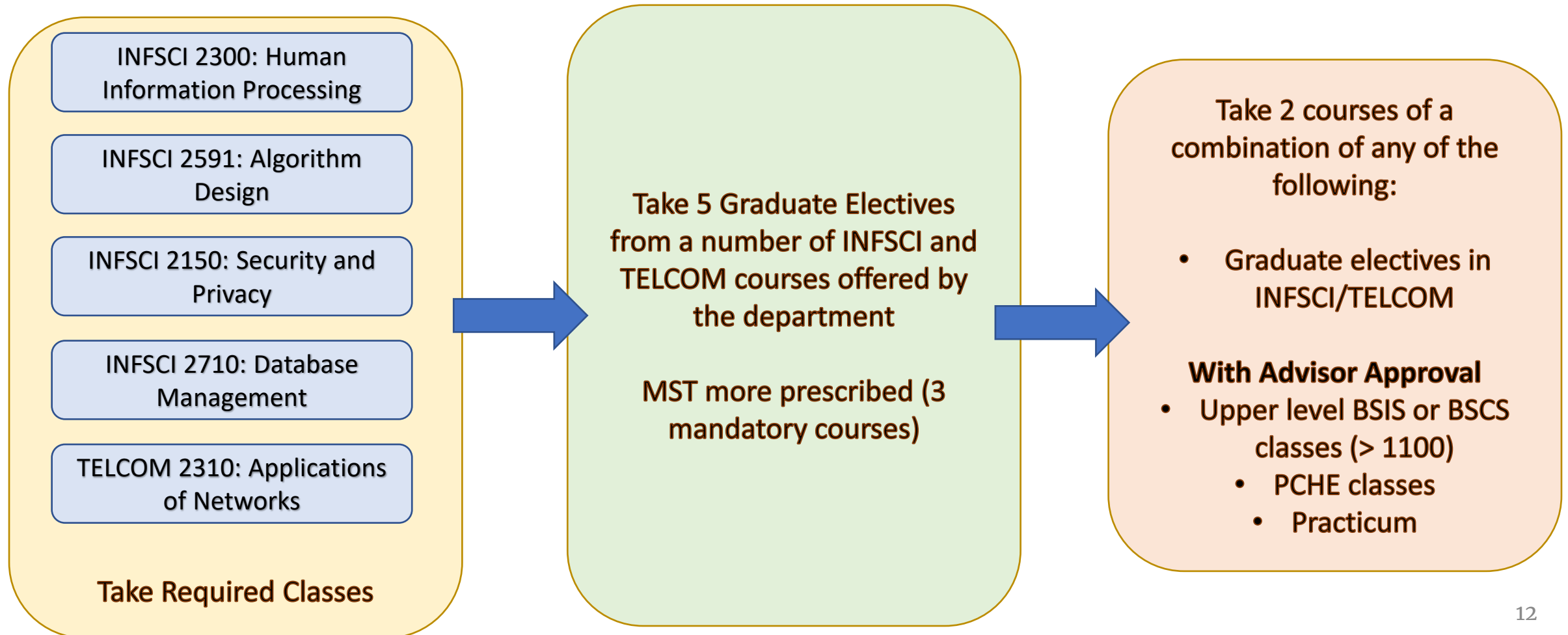
# Features of Our Programs

- Our MS programs address information science from 3 aspects:
  - People
  - Data/Information.
  - Networks/Systems
- You will design better systems because you know how users think and how networks transmit the data.
- You will graduate with not only the mastery of today's technology, but also the ability to understand and implement technology of future.

# Getting ready for success!

- If undergrad in IS/CS/CE, our MS deepen knowledge and expand skillset
  - Can gain in-depth knowledge of specific area: big data, cybersecurity, for example.
- If non-computational undergrad degree, our MS provide complimentary skills to make you more marketable
  - For example, Mathematics degree is great, but very powerful when combined with MS coursework in databases, data mining, information visualization

# The MSIS and MST Curriculum



# Core Courses

- Required for all MS Students
- Why? To make sure that everyone starts with the same foundational knowledge.
- No waivers of Core Courses
- What order to take them in?
  - In your earliest terms
  - Take Telcom 2310 first, then INFSCI 2150
  - Take INFSCI 2710 and INFSCI 2591 as soon as possible

# Beyond the Core – Elective Courses

Information Storage & Retrieval	Social Computing
Cryptography	Intro to Neural Networks
Social and Heterogeneous Graph Mining	Machine Learning
Artificial Intelligence	Adaptive Information Systems
Security Management & Computer Forensics	Network Science & Analysis
Information Visualization	Human-Robot Interaction
Immersive Media Applications	Cloud Computing

# MSIS – General

- General Plan of Study
  - Allows you to explore different areas
  - More flexibility in course selection
  - You can still get an in-depth education in an area
  - Rapidly changing field
    - In the years to come, you NEVER know what will be important in the workplace

# MSIS – Specializations (*Optional*)

- Big Data Analytics
  - Database and Web Systems
  - Geoinformatics
  - Human-Centered Computing
  - Information Security
  - Telecommunications & Distributed Systems
- More prescriptive
  - Encourages “Focus”
  - May need additional Pre-requisites
  - Appears on Transcript, not diploma



# Big Data Specializations

- Same core
  - the same five core courses
- different electives
  - three specialization required classes
  - Two specialization electives
- Same two additional electives

## Big Data Analytics

### BIG DATA ANALYTICS REQUIRED CLASSES

Students in the Big Data Analytics specialization must take the following three required courses.

[INFSCI 2140 - Information Storage and Retrieval](#)

[INFSCI 2160 - Data Mining](#)

[INFSCI 2595 - Machine Learning](#)

### BIG DATA ANALYTICS ELECTIVES

Students in the Big Data Analytics specialization must take two electives from the following list:

[INFSCI 2125 - Network Science and Analysis](#)

[INFSCI 2410 - Introduction to Neural Networks](#)

[INFSCI 2440 - Artificial Intelligence](#)

[INFSCI 2750 - Cloud Computing](#)

[INFSCI 2801 - Geospatial Information Systems](#)

[INFSCI 2809 - Spatial Data Analytics](#)

# If you need to refresh your skills (*or Admission Conditions*)

- Programming
  - Take CMPINF 0401 or INFSCI 0201 (will not count for your Master's degree).  
CMPINF 401 – Java; INFSCI 0201 – Python
- Math
  - Take INFSCI 2020 (but right away – once you complete some core classes, you cannot go back and take it)
- Data Structures
  - Take INFSCI 2500 (but right away – once you complete some core classes, you cannot go back and take it). INFSCI 2500 is a pre-requisite for several courses.

# What Else You Will Learn Here

- Our MS coursework hone following critical skills
  - Analysis and analytical thinking
  - Problem-solving
  - Communication
  - Project management
- Because employers are looking for these skills

# Opportunities to Apply What You Learned

- You can APPLY what you learn in volunteer activities, practicum (internships) and co-ops.
- Most, if not all, classes incorporate a team project, so gain experience needed for working in industry.
- You can do research with faculty, perhaps even on a publication or conference presentation.
- You can graduate with a portfolio of projects/systems to show employers what you can do on DAY ONE!

# Hands-on Learning in MS Programs

- Encouraged and recommended by the faculty
- Practicum is a 3 credit course - **with strong academic component**, in Western PA
- Co-Op is a 1 credit rotation (semester) anywhere in the US which carries full-time student status but does not count towards graduation.

# Opportunities for research

- Aiming to get into a PhD program?
- Aiming to get a taste of research?
- Aiming to work with a faculty member on some cool projects?
- Aiming to have fun and still earn academic credits?
- Think about Independent Study, or MS Thesis

# Independent Study

- Encouraged and recommended by the faculty
- Undertake research supervised by Department faculty
- Independent research project – what would you find to be interesting?
- Earn credit and finished project might result in publication or conference presentation
- Great addition to your resume!

# MS Thesis

- Not required, but great option for MS students interested in pursuing PhD
- Under guidance of Thesis advisor and Committee, students will:
  - conduct an innovative research project,
  - explore a focused topic area
  - gain research experience,
  - improve publication record
  - Explore their interest in pursuing a research and/or an academic career.
- A successful Master's thesis will generate high quality research publications, deepen understanding of a research topic, and increase the competitiveness in applying to a PhD program within the University of Pittsburgh or other academic institutions.



# Career Success for MS grads

Position Type	Employer	Position Type	Employer
Software Development Engineer	Amazon	Data Scientist	Capital One
Software Engineer	Facebook	Data Engineer	WePay, Inc
Software Engineer	Cisco	Information Analyst	Children's Hospital of Philadelphia
Cyber Security Engineer	Carnegie Mellon University	Decision Support Analyst	Highmark Health
Network Engineer	Charter Communications	User Experience Designer	UPMC
Network Engineer	Google	Business Intelligence Analyst	Mylan
LTE/IMS Service Assurance Engineer	AT&T Labs	Technology Consultant	Deloitte Consulting
Senior Software Testing Engineer	Visa	Communications Engineer	Bombardier

# Join Our DINS Community

- Almost 400 DINS students:
  - Around 200 MS students
  - Over 60 PhD students
  - Over 100 BS students
  - some Graduate Certificate Students

# Employment Projections:

Network Architect  
4% growth

Developers/Quality Assurance Engineers  
25% growth

Systems Analyst  
10% growth

Web Developer  
16% growth

Database Administrators  
8% growth

Security Analyst  
32% growth

*From the Bureau of Labor Statistics*

# Questions?



# School of Computing and Information



## Department of Computer Science »

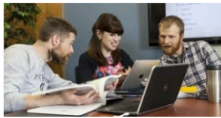
How do you take a problem and abstract it in ways that the computer can understand it, then put the data structure and algorithms in place? Our computer science degree programs give students a deep understanding of computational thinking and the necessary research for future applications.



## Department of Informatics & Networked Systems »

These degree programs look at both the physical technology and enabling processes to share information and keep it secure, plus the advanced knowledge essential for designing and managing information systems to meet the needs of businesses, people and society.

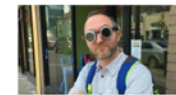
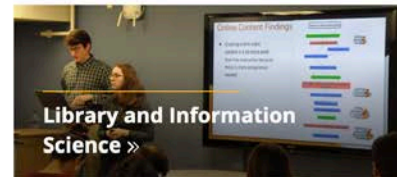
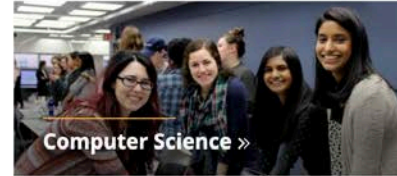
Read more about how DINS students [use data and machine connections to solve problems](#).



## Department of Information Culture & Data Stewardship »

Information professionals are the human interface that connects people, information and technology. These degree programs provide a strong grounding in the skills, knowledge and ethical practices of the information professions and share insights into the broader role of information in culture and society.

## Master's Degrees



### How to anticipate hiccups in health care »

Dmitriy Babichenko [aims to alleviate the burden](#) on medical providers.



### Preserving a shared digital memory »

Chelsea Gunn [sustains digital presences](#).



### Holding information technologies accountable and addressing misinformation on the web »

Yu-Ru Lin [takes a computational social science approach](#) to social media.



### More than an afterthought: Dr. Ibrahim shows students the necessity of cybersecurity »

Dr. Ahmed Ibrahim [teaches his students](#) to think like an adversary.

# Opportunities for studying at a prestigious university in a beautiful and safe city

- Be part of the Pitt community
- Be part of the Pittsburgh community
- Can study, live, and work in a safe city that's big on cultural and social amenities, but easy to navigate!

# University of Pittsburgh

- The University of Pittsburgh is one of the 30 oldest operating universities in the country, having been chartered in 1787.
- Member of American Association of Universities, most prestigious group of Research Universities
- Named Top Fulbright Producing Institution
- Wall Street Journal/Times Higher Education College Rankings again named the Pittsburgh campus as the No. 1 public university in the Northeastern United States.



# Graduate Student Life at Pitt

- Graduate Student Services: [Home | Graduate Studies \(pitt.edu\)](#)
- Graduate Studies Catalog : [Department: - Department of Informatics and Networked Systems - University of Pittsburgh - Acalog ACMS™](#)
- Want to live on campus?: [Residences on Bigelow | Panther Central | University of Pittsburgh](#)
- Graduate Student Organizations: [GRADUATE STUDENTS | Student Affairs \(pitt.edu\)](#)
- SCI Graduate Student Organization: [School of Computing and Information Graduate Student Organization | School of Computing and Information | University of Pittsburgh](#)



# Student Life: Health and Safety

- Emergency Alert System: [Emergency Notification Service \(ENS\) and Crime Alerts | Information Technology | University of Pittsburgh](#)
- Emergency Contacts: [Emergency Numbers | Information Technology | University of Pittsburgh](#)
- Graduate Student Health and Wellness: [Health and Wellness | Graduate Studies \(pitt.edu\)](#)
- International Student Support: [Resources for International Students | Graduate Studies \(pitt.edu\)](#)

# Living in Pittsburgh

The “57 varieties” touted by Heinz in a 1934 cookbook included Heinz Cream of Oyster, Heinz Breakfast Wheat and Heinz Mock Turtle Soup-[25 Charming Facts About Pittsburgh | Pittsburgh Magazine](#)

- 90+ charming neighborhoods, each with unique character
- 1700+ acres of parks
- 180 miles of trails within the city
- Home to world-class symphony and opera, National Football League team and internationally-recognized Carnegie Museums, and quirky attractions such as 400+ bridges, 33 miles of riverfront biking and hiking opportunities, and more than 3000 restaurants!

Venues such as:

Mount Washington

Warhol Museum

Phipps Conservatory



# Living In Pittsburgh

- Great Resource on Pittsburgh Life and Community: [Home | Cool Pittsburgh | University of Pittsburgh](#)
- Pitt student-created website showing the known and unknown of campus: [Home | Secret Pittsburgh](#)
- Want to live off Campus? - [Home | Explore Off-Campus Living | University of Pittsburgh](#)
- Newsletter with Popular Pittsburgh Events and Attractions : [Things to do in Oakland, Pittsburgh – NextPittsburgh](#)

# Resources

- Graduate Global Ties – a Pitt peer-mentoring program of graduate and international students-[International Programs \(Global Ties\) | Student Affairs \(pitt.edu\)](#)
- Department's web site – [www.dins.pitt.edu](#)
- OIS – experts on visa and immigration – [www.ois.pitt.edu](#)
- Pitt and Covid – [www.coronavirus.pitt.edu](#)
- FAQ for Newly Admitted Students -- [www.sci.pitt.edu/student-resources/newly-admitted-students/new-graduate-student-faq](#)

# Master of Science in Telecommunications

- **Same core courses**

- INFSCI 2300 Human Information Processing
- INFSCI 2591 Algorithm Design
- INFSCI 2710 Database Management
- Telcom 2310 Applications of Networks
- Telcom 2810 Information Security and Privacy

and

- **INFSCI 2011 Telecommunications Seminar**

- Students in the Master of Science in Telecommunications program must take the following three required courses:

- [TELCOM 2120 - Network Performance](#)
- [TELCOM 2700 - Introduction to Wireless Networks](#)
- [TELCOM 2821 - Network Security](#)

- **MST Electives**

- Students in the Master of Science in Telecommunications program must take two electives from the following list:

- [INFSCI 2125 - Network Science and Analysis](#)

[INFSCI 2160 - Data Mining](#)

[INFSCI 2595 - Machine Learning](#)

[INFSCI 2621 - Security Management and Computer Forensics](#)

[INFSCI 2750 - Cloud Computing](#)

[INFSCI 2170 - Cryptography](#)

[TELCOM 2321 - Wide Area Networks](#)

[TELCOM 2010 - Computer Networking Laboratory](#)

# Graduate Certificates

- Cybersecurity, Policy and Law
- Information and Network Security
- Big Data Analytics

# Big Data Analytics

The 15-credit certificate program in Big Data Analytics is designed to address the needs of professionals with a Bachelor of Science or a Master of Science degree in Information Science or a related field. Students in this program learn to effectively handle large amounts of disparate data.

Big data involves three major dimensions: data size, data rate, and data diversity. We provide our students with essential, in-depth knowledge of techniques and technologies relevant for big data management.

The courses offered allow you to tailor your program of study to your individual interests.

## Courses

Students can select from the following courses across the three schools to build a program around their interests:

### Core Courses:

- Post-Bachelor's students must complete three of the following courses with a grade of C or better:
  - [INFSCI 2160 - DATA MINING](#)
  - [INFSCI 2591 - ALGORITHM DESIGN](#)
  - [INFSCI 2711 - ADVANCED TOPICS IN DATABASE MANAGEMENT](#)
  - [INFSCI 2595 - MACHINE LEARNING](#)
  - [INFSCI 2750 - CLOUD COMPUTING](#)

### Elective courses

- Post-Bachelor's students must complete two of the following courses with a grade of C or better:
  - [INFSCI 2140 - INFORMATION STORAGE AND RETRIEVAL](#)
  - [INFSCI 2410 - INTRODUCTION TO NEURAL NETWORKS](#)
  - [INFSCI 2430 - SOCIAL COMPUTING](#)
  - [INFSCI 2801 - GEOSPATIAL INFORMATION SYSTEMS \(GIS\)](#)
  - [INFSCI 2809 - SPATIAL DATA ANALYTICS](#)
  - [INFSCI 2125 - NETWORK SCIENCE AND ANALYSIS](#)
  - [INFSCI 2415 - INFORMATION VISUALIZATION](#)

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  - [INFSCI 2415 - INFORMATION VISUALIZATION](#)



# Cybersecurity, Policy and Law

Cybersecurity is a multidisciplinary domain that involves technical issues, security policies, regulation, and law. Our integrated curriculum—incorporating coursework from Pitt’s School of Computing and Information, Graduate School of Public and International Affairs, and School of Law—provides students with the skills to develop comprehensive cybersecurity policies and strengthen cybersecurity ecosystems to minimize risk.

As part of the certificate’s multidisciplinary approach, the certificate requires courses to be taken from all three Pitt schools. Students must [complete a minimum of three courses from SCI](#), [one course from GSPIA](#), and [one course from the School of Law](#) to earn the certificate.

## Courses

Students can select from the following courses across the three schools to build a program around their interests:

### School of Computing and Information courses

[INFSCI 2150 - Information Security and Privacy](#)

[TELCOM 2821 - Network Security](#)

[INFSCI 2620 - Developing Secure Systems](#)

[TELCOM 2811 - Hacking for Defense](#)

[INFSCI 2621 - Security Management and Computer Forensics](#)

[CS 2053 - Applied Cryptography and Network Security](#)

[CS 2530 - Computer and Network Security](#)

[CS 3525 - Advanced Topics in Security and Privacy](#)

### Graduate School of Public and International Affairs courses

PIA 2156 - Ethics and Policy in Cyber Space

PIA 2379 - Introduction to Cyber Crimes

PIA 2360 - Cyber Security Policy

PIA 2389 - Criminal Operations in the Cyberworld

PIA 2327 - Terrorism and Counter Terrorism

PIA 2346 - Introduction to American Intelligence

PIA 2365 - Transnational Crime

PIA 2041 - Policy Analysis for Cybersecurity & Intelligence Studies

### School of Law courses

LAW 5623 - Cyber Law, Policy & Security

LAW 5380 - Cybercrime

LAW 5404 - Cyberspace and the Law

LAW 5430 - Information Privacy Law and Practice

LAW 5260 - Intellectual Property

LAW 5877 - Public Policy Seminar

# Information and Network Security

This 15-credit graduate certificate in Information and Network Security is designed to address the needs of professionals who hold a baccalaureate or master's degree in Information Science or a related field in order to expand their professional skills and qualifications in cybersecurity.

The University of Pittsburgh's School of Computing and Information is widely recognized for our excellence in cybersecurity research and education. The School has been designated a National Center of Academic Excellence in Information Assurance Education (CAE-IAE) since 2004 and enjoys a top ten ranking among more than 400 institutions of higher education with programs in Cybersecurity.

## Required Core Courses

Students must complete the two following courses with a grade of B- or better:

[INFSCI 2150 - Information Security and Privacy](#)

[TELCOM 2821 - Network Security](#)

## Elective Courses

Students must complete three elective courses with a grade of C or better. A list of recommended elective courses is provided below. With advisor approval, students may choose an alternate elective.

[INFSCI 2170 / TELCOM 2820 – Cryptography](#)

[INFSCI 2560 - Network and Web Data Technologies](#)

[INFSCI 2620 - Developing Secure Systems](#)

[INFSCI 2621 / TELCOM 2813 - Security Management and Computer Forensics](#)

[TELCOM 2120 - Network Performance](#)

[TELCOM 2700 - Introduction to Wireless Networks](#)

## Other Requirements

Coursework must be completed within a period of four calendar years from the student's initial registration in the graduate certificate program.