



**ini**

Carnegie Mellon University  
Information Networking Institute

# The Network

# INNOVATE IN THE WILD

*Practicum projects provide real-world  
industry experience in Silicon Valley*

**LAUNCHING OUR  
STRATEGIC PLAN**

**WHY CULTURE  
MATTERS**

**GET TO KNOW  
OUR STUDENTS**

2016-17 EDITION | ANNUAL MAGAZINE OF THE INI

# Welcome

## Message from the Director

It's been an incredible year at the INI. We welcomed 137 new students from nine countries into our MS28 class and six new staff and faculty into our INI family. Turning our eyes to the future of the INI, we engaged in six months of strategic planning and launched a five-year strategic plan entitled "Together We Can Shape the Future." One of our first initiatives was called the BOB project: 'Building Our Bridges' from the Pittsburgh campus to our Silicon Valley campus. INI faculty and staff worked tirelessly for more than five months to develop an unparalleled industry-sponsored practicum experience for INI students at both campuses.

2016 also marked the year we reached the milestone of 1,700 individuals in our alumni community. Seeking to create a dynamic opportunity for alumni engagement, we launched a new online mentoring platform called FirstHand to connect alumni with INI students. Thank you to the more than 280 alumni who have already registered as an advisor - we need your help to make this platform a success!

This edition of *The Network* highlights our core strength – our people, who are the fabric of the INI.

*I believe that together we can shape the future.*  
**Are you with me?**



A handwritten signature in black ink that reads "D. Tsamitis".

Dr. Dena Haritos Tsamitis  
Director of the INI



### ON THE COVER:

"Ineffability" is the artwork of Andrew Werth (MS03), composed of Turing Patterns. Read his story on page 25 and see more of his work at [www.andrewwerth.com](http://www.andrewwerth.com).

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# 2016-17

Annual INI Magazine

## ABOUT THE INI

The Information Networking Institute (INI) at Carnegie Mellon University (CMU) educates and develops engineers through technical, interdisciplinary master's degree programs in information networking, security, and mobility that incorporate business and policy perspectives. Founded in 1989, it is an integral department of the College of Engineering, and a collaboration of the School of Computer Science, the Tepper School of Business and the H. John Heinz III College. With an advanced, specialized curriculum combining computer science, electrical and computer engineering, software engineering, and information systems, the INI's programs uniquely position graduates for next-generation careers at the pulse of the tech industry.

### Interdisciplinary Master's Programs

MS in Information Networking (**MSIN**)

MS in Information Security (**MSIS**)

MS in Information Technology (**MSIT**)

Mobility (**MSIT-MOB**)

Information Security (**MSIT-IS**)

## CONNECT WITH US



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2016

# Practicum Projects

# INNOVATE IN THE WILD

Bridging the gap between theory and practice, the practicum project offers real-world industry exposure for INI's bicoastal students.

**P**lanning to drive your electric car today but not sure if you have enough charge to make it to Trader Joe's?

"Just ask Alexa," said **Rishikesh Yardi**, a Master of Science in Information Technology-Mobility (MSIT-MOB) student.

Utilizing Internet of Things (IoT) innovations like the Amazon Echo, his team of fellow Information Networking Institute (INI) students sought to optimize energy consumption on the modern electric grid in the project-based capstone course known as the practicum.

"I feel so happy to be solving problems that stand in the way of building a 21st-century grid," said Yardi. Under the direction of SLAC National Accelerator Laboratory, the team of

INI students built speech recognition-based technology systems to help consumers optimize energy usage – like when to charge their electric car or run the washing machine – by leveraging learning and APIs available to developers.

During the fall 2016 semester, Adobe, Ericsson, Google and Carnegie Mellon University (CMU) also sponsored practicum projects with topics spanning from smartphone sensors and drone imagery to container security and movie recommendation systems.

Ten teams of MSIT students built web platforms and mobile apps, analyzed user surveys, created novel research tools and made valuable contributions to the fields of computing, mobile systems and security.

*"The practicum is an opportunity for students to work in an industry environment, applying their knowledge to solve real-life problems while learning from experts in the field."*

*"They are truly innovating in the wild."*

– **Dena Haritos Tsamitis**,  
INI Director



REACHING NEW  
HEIGHTS IN  
SILICON VALLEY.



Ten teams of bicoastal MSIT students built web platforms and mobile apps, analyzed user surveys, created novel research tools and made valuable contributions to the fields of computing, mobile systems and security.



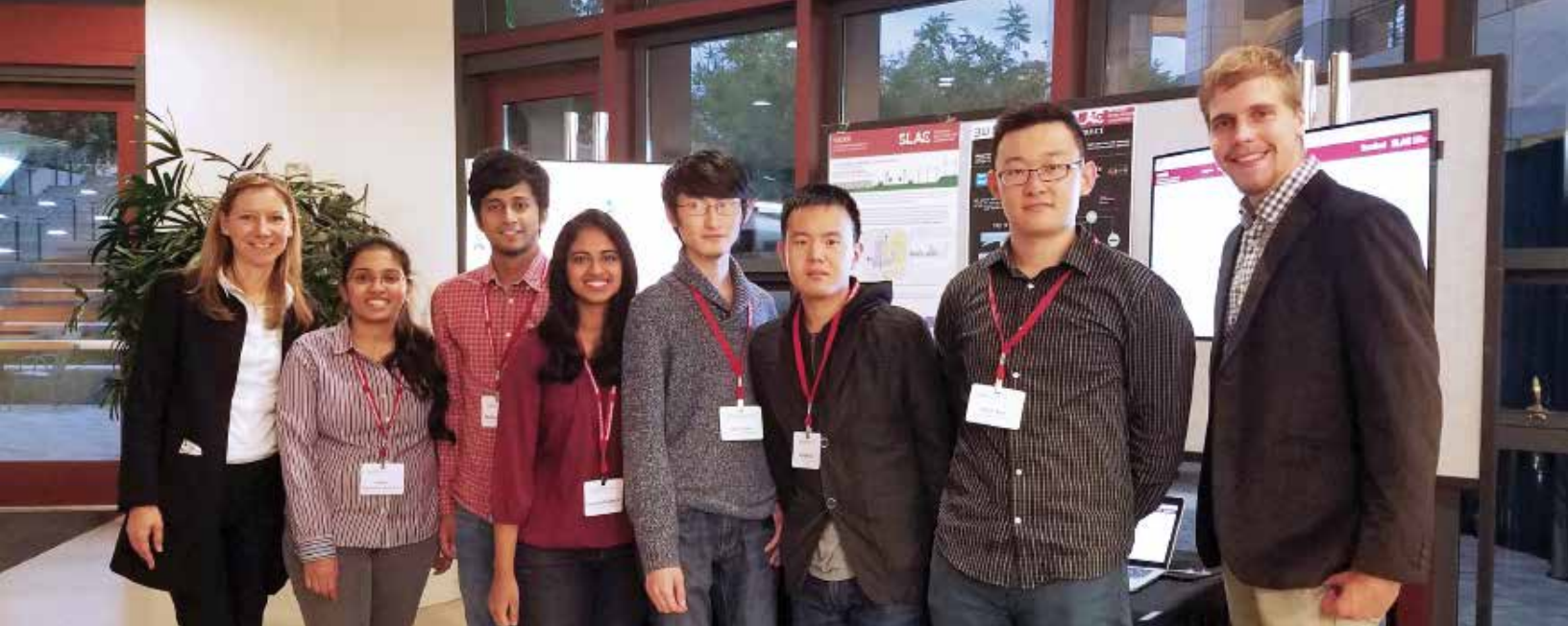
Team Google with client sponsor Trevor Pering.



SLAC's practicum team presented at Stanford University's Bits & Watts Conference in October.



CMU Silicon Valley professor Tony Wasserman's team evaluated free and open source software.



## Working Alongside Industry Leaders

The results of practicum projects often reach a wide audience in the form of a published research paper or continued collaboration after the semester has ended.

Last year, Ericsson's team was published in the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems and this year, SLAC's two teams showcased their work at Stanford University's Bits & Watts Conference.

*"The INI students brought an amazing energy and enthusiasm. They also brought an amazing set of skills and new tools," said Sila Kiliccote, staff scientist and leader of SLAC's Grid Integration, Systems and Mobility research. "My goal is to mentor them in a way that will guarantee their success."*

One of the key takeaways for students is mentorship by industry leaders.

"The best part about working with Ericsson was that our sponsor was very interested and extremely involved," said **Tanima Makkad**, a MSIT-Software Management student. Her team dealt with live user data and a database of hundreds of movies to develop a research tool that compares movie recommendation algorithms for platforms similar to Netflix.

"Not everyone has the chance to play with real-world data," she said, noting that this distinction set the practicum apart from typical classwork.

## Impacting the Field

In a continuation of one student's summer internship experience, Adobe's practicum team analyzed the state of container security. By providing solutions to improve upon security weaknesses, these students contributed to a bleeding-edge domain with far-reaching implications.

"Working alongside top-notch security engineers at Adobe has the added advantage of being able to learn from their insights about security practices," explained **Shivani Singhal**,

a MSIT-Information Security student. "These skills will be very useful when we step into corporate life as young security engineers."

According to Singhal, one of the best parts of the practicum is Adobe's requirement that the research be published. By sharing their results, the students hope to give back to the security community from which they have learned so much.

Yet perhaps the greatest benefit – and challenge – of the practicum is learning to navigate the client relationship and bolster project management skills.

"As can be seen with great products and innovation, the customer might not exactly know what is needed," explained **Aparna Sridhar Murthy**, a MSIT-MOB student whose team worked alongside Google's IoT Lab. "It is our job as innovators to really understand the requirements and define the solution upon getting into the depth of the problem statement."

## 2016 SPONSORS

- Adobe (1)
- Carnegie Mellon University (3)
- Ericsson (3)
- Google (1)
- SLAC National Accelerator Laboratory (2)

## Want to sponsor a practicum?

We start accepting proposals from corporate, government and research sponsors in May 2017.

### VISIT

[www.ini.cmu.edu/practicum](http://www.ini.cmu.edu/practicum)

### EMAIL

[ini-practicum@andrew.cmu.edu](mailto:ini-practicum@andrew.cmu.edu)

# Strategic Plan 2021

Together we can shape the future.

**W**ith extraordinary agility, the INI has navigated the changing landscape of technology from wired communications in the 1980s to wireless, mobile and Internet of Things in today's world. What began as a small fledgling program has evolved over the past three decades to become an integral department of Carnegie Mellon's College of Engineering and home to over 300 students each year from across the world.

*Amid such rapid growth and change, we have now arrived at a critical juncture. Our strategic plan is deliberate and thoughtful. We have considered our strengths, solidified our identity and determined a path forward. Now the work begins.*

## Attract and Enroll the Brightest Students



Makers and thinkers, hackers and scholars, researchers and programmers – the INI seeks to recruit and cultivate the brightest of these minds.

The INI will strengthen our brand and engage in strategic, diversity-focused recruitment efforts and the identification of new markets in order to expand the INI's reach and influence.

## Enhance the Academic and Student Experience



A flexible, interdisciplinary curriculum and an unparalleled student experience are among what set the INI apart from its peers. It is essential that students develop the knowledge and skills to be successful in the global market.

We will engage in a deep, comprehensive curriculum evaluation to ensure these goals are being met and that each program is aligned with its interdisciplinary learning objectives.

## Build Lifelong Alumni Engagement

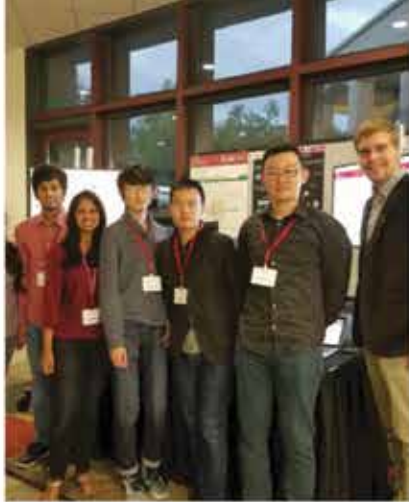


The INI's alumni go on to serve high-powered companies, tech start-ups and government agencies. We recognize the value of our alumni, and seek to strengthen the bonds between the INI, our 1,700+ alumni and our current and prospective students.

By facilitating meaningful opportunities for alumni to remain connected with the INI, we lay the foundation for lifelong engagement.

Download the INI's strategic plan at [ini.cmu.edu](http://ini.cmu.edu) >





“Paramount to our efforts will be a strategic investment in strengthening the INI’s brand. By highlighting our unique strengths, we will attract the best and brightest students.”



# 13 Things That Make Us Proud

**1**  
**137**  
*New Students*



Our MS28 class is drawn from **9 countries**: Argentina, Dominican Republic, China, India, Philippines, Saudi Arabia, Singapore, Taiwan and the United States.

**2**  
**1,700 ALUMNI**

We've reached a huge milestone: 1.7K members in our alumni community. If you haven't joined our closed groups on Facebook and LinkedIn, do so today!



**3**  
**INNOVATE**  
*In the Wild*

Google, Adobe, Ericsson, CMU and SLAC National Accelerator Laboratory sponsored 10 practicum projects for bicoastal students at CMU Silicon Valley.



**4**  
**PREPARING WOMEN LEADERS IN  
INFORMATION SECURITY**

In 2007, the INI established a partnership with the Executive Women's Forum (EWF) to jointly offer a full scholarship to an incoming INI student. The partnership has been **renewed after 10 years** and will continue to offer invaluable networking and mentorship opportunities to develop women leaders in information security and privacy.

**5** **NEW FACES at the INI**



**1** Martin Carlisle, *Director of Academic Affairs and Teaching Professor*  
**2** Asia Donegan, *Academic Affairs and Student Services Coordinator*  
**3** Kevin Topolski, *Assistant Director of Business Operations*  
**4** Anita Persaud, *Manager of Diversity and Outreach*  
**5** Jessica Budik, *Associate Director of Career Services*  
**6** Emory Sen, *Receptionist*

## 6 Hello \$113,159

That's the average MS27 salary, an increase of over three percent from last year's class. Top employers are Google, Amazon, Microsoft, FireEye, Visa, Yelp and Department of Defense.



## 7 LEADING THE WAY

INI director Dena Haritos Tsamitis joined the American College of Greece Board of Trustees and the advisory board of the Executive Women's Forum (EWF).

## 8 \$23M+

total CyberCorps Scholarship for Service funds since 2001

## 9 LAUNCHED OUR Strategic Plan

The INI engaged in six months of strategic planning and launched our five-year plan entitled, Together We Can Shape the Future.

## 10 WE LOVE Hackathons

...especially when we win. INI students brought home big wins at Microsoft's Build the Shield and AT&T's Mobile App Hackathon.

## 11 WHERE IN THE WORLD did INI students intern this summer?



Top tech companies and government agencies like LinkedIn, Adobe, Software Engineering Institute, Palo Alto Networks and more!

"The coolest part is that I worked with a huge dataset of all LinkedIn members using big data tools and my feature will finally be part of the LinkedIn app," said Yuqi Liu, MS27 MSIN student.

## 12 Cybersecurity Education OUTREACH Capture the Flag!

Melanie Rich-Wittrig (MSIS, MS27) hosted a Capture the Flag workshop for Virginia high school students at George Mason University's Cybersecurity Youth Conference.



## 13 CYLAB WINS BIG AT DEFCON

ForAllSecure, a Carnegie Mellon University spinoff startup, took home \$2 million in prize money as the winners of the DARPA Cyber Grand Challenge (CGC), a first-of-its-kind hacking contest in which all participants were autonomous computer systems.

# EQUAL RESPECT

## Why Culture Matters



An excerpt from Dr. Dena Haritos Tsamitis' October 2016 ITSP Magazine article about diversity and inclusion.

**T**hrough Women@INI (WINI) meetings and one-on-ones with my students, I hear about the gender bias and disparity that our students face as women in the tech field. Last year, a student approached me after Carnegie Mellon's Technical Opportunities Conference (TOC) to share how her excitement of receiving offers from big-name companies was squashed by her male peers' judgment that she had only been offered such opportunities to meet a gender quota.

Another was offered a job following two interviews – skipping over the technical interview – and thought that she had really blown them out of the water. As she later found out, the company systematically enabled female hires to bypass the technical interview, not only creating resentment among males towards their female col-

leagues, but also creating a culture of inequality and disparity in technical roles by gender.

An equal playing field and equal respect are what we strive for with WINI, established in 2005 to create a nurturing and inspiring learning environment that promotes and celebrates gender and cultural equality and diversity, both within and beyond the INI.

As WINI enters its eleventh year, I hope that we can inspire our students, other schools, and larger organizations to create similar programs that encourage women in STEM. I couldn't be more proud of my students and alumni – and for the ripple effect that they've created in breaking down barriers and gender disparity in the STEM fields.



*WINI celebrated its tenth anniversary in 2015 by welcoming an incoming class that consisted of 34 percent women.*

 You can read the full article on the INI's website >

 INI is a sponsor of the Equal Respect initiative. Join the movement on Equal Respect's Facebook group >

# 10 Years of Grace Hopper

Nearly 15,000 women technologists flocked to Houston, Texas for the Grace Hopper Celebration of Women in Computing Conference (GHC) in October 2016. Among these female scientists, researchers and entrepreneurs were INI students and alumnae representing Carnegie Mellon for the tenth year.

Year after year, INI alumnae from companies like Apple, Google, Facebook, Yahoo and Cisco return to the GHC to recruit, network and learn. This year, **Luz Jaramillo** (MS22), senior IT compliance specialist at Electronic Arts, gave a talk in the security/privacy track.

"We are bombarded by these numbers about inequality and how difficult it is for girls to stay in tech, but when you see so many talented women together you feel encouraged to work hard towards making this problem disappear," explained **Raquel Rodriguez Jimenez** (MS27). "It's a great way for girls to see that tech is a field for women, there's lots of us and we love what we do."

Attending and sponsoring Grace Hopper for the past decade is just one example of the INI's long-standing commitment to increasing diversity in the field of engineering.

In addition to GHC, the INI attended the following diversity-focused conferences in 2016:

- Women in Cybersecurity
- National GEM Consortium
- ACM Richard Tapia Celebration of Diversity in Computing
- Women in Computing Celebration (Carolinas and Capital Regions)
- HENAAC STEM Career Conference
- Louis Stokes Midwest Center of Excellence (LSMCE)



- Yasmine Kandissounon (MS24) led a workshop about how to hack for fun, profit and ethics.
- INI students with Professor Limin Jia at Grace Hopper.

## Supporting Our Students

Established in 2015, the Director's Fellowship is a partial- and full-tuition scholarship removing financial barriers to attending the INI.

In a continued effort to provide funding opportunities to highly-qualified applicants, the INI has established the Director's Fellowships, which will provide partial- and full-tuition scholarships to incoming INI students.

"By removing financial barriers, the Director's Fellowship affords aspiring technology leaders the opportunity to follow their dreams and advance their education at Carnegie Mellon," said Dena Haritos Tsamitis, director of the INI. "The driving force behind these

scholarships is the mission to support talented students in reaching their full potential as they prepare for exceptional careers in technology."

**A number of other financial support opportunities exist to support INI students, including:**

- INI-EWF Fellow Fund
- Named Graduate Legacy
- Graduate Student Fellowship Fund
- Joyce Brocaglia-EWF Endowed Fellowship

### Want to Give?

Online: [giving.cmu.edu/INImag](http://giving.cmu.edu/INImag)

By Mail: **Fill out the Giving Envelope contained in this magazine.**

More Information:  
Contact Jennifer Feyrer  
Director of Corporate and Alumni Engagement  
[jfeyrer@cmu.edu](mailto:jfeyrer@cmu.edu) | 412-268-9292

# Meet the Director's Fellows

## CALEB

From the Dominican Republic to the Steel City, Caleb De La Cruz is following his dream.

During Caleb De La Cruz's first week at Carnegie Mellon University (CMU), he found himself eating ice cream with classmates from four different continents. Over the next month, he had tried a pair of Google Glasses, secured an interview with Pinterest, ate cheese with an Intel recruiter at the INI's Mix & Mingle and cruised the three rivers of Pittsburgh.

One of his first homework assignments was defusing a bomb. "I forgot I was studying, I was just being a hacker secret agent," said De La Cruz.

He describes courses at CMU as extremely challenging and incredibly interesting. "They force you to be creative, to solve problems without Google and just to immerse yourself in the course," he added.

De La Cruz is a MS28 MSIT-Mobility student from the Dominican Republic. He worked as an Information and Communication Technologies (ICT) engineer while completing his undergraduate degree, all the while saving to attend graduate school.

"I always dreamed of studying at one of the top 10 colleges in the United States," he said. After five years spent working and saving, learning English, participating in international mathematics competitions and earning high scores on the GRE and TOEFL, his hard work paid off and he arrived in Pittsburgh to begin his studies.

"My dream is to create software that can make your life a little bit better," he said. "Yes, it's a long-term goal, which involves education, practice and experience. INI is covering the education part of that dream."



**De La Cruz is a 2016 Director's Fellow.**

# GOLDY

After 15 years at Proctor & Gamble (P&G), MS28 Goldy Lim decided to head back to school to study information security.

“Be prepared to buckle down and work hard,” she said. “I am learning a lot, but the courses are a lot more challenging than I expected. The professors are all experts in their fields, and I feel very privileged to be learning from them.”

As the Asia Regional Governance Leader at P&G, Lim was responsible for managing the company’s strategic partners in Asia. Her first introduction to information security came during a stint as an IT auditor, where the thrill of eliminating or mitigating control risks and making P&G just a bit safer gave her great satisfaction.

*“Cybercrimes are becoming more and more sophisticated, which means the field will continue to challenge me and keep me interested for years to come,” she said.*

That is why she turned her eyes outside the company and decided to follow her passion for information security. Lim chose the INI for its reputation of academic excellence and the bicoastal opportunities afforded in the MSIT-Information Security (MSIT-IS) degree.

“The MSIT-IS degree looked like a great opportunity to both learn the technical skills I needed, and practice them in real-life projects with Silicon Valley companies,” she said.

Her dream career is a C-suite level position in information security. She wants to develop the right tools, processes and skills to improve security controls and better safeguard corporate and customer assets.

“The INI can help me get there by providing not only the relevant skills, but also the network of contacts to help me connect with the right people in the right companies to get me started,” she said.



Lim is a 2016 Director’s Fellow and recipient of the first Joyce Brocaglia Executive Women’s Forum-Endowed Fellowship.





Chilano is a 2016 Director's Fellow.



# PATRICIO

To enter the fight against cybercrime, first comes a master's degree in information security.

Patricio Chilano views information security as a puzzle.

"The field forces you to know about so many different areas: operating systems, networking, cryptography, web applications and programming languages," said Chilano. "The more subjects you learn, the more pieces of the puzzle you have."

Chilano is a MS28 MSIS student and a 2016 Director's Fellow. He studied electronic engineering at the University of Buenos Aires, and worked for three years as an IT consultant and system administrator before deciding to focus on computer security. Though his undergraduate degree covered hardware and software topics, he lacked a security perspective and decided to specialize.

*"The reason why I applied to the INI is because the graduate program is the most technical I have found compared with others," he said.*

The program's flexibility is another major plus for Chilano, who is enjoying taking courses from departments in the School of Computer Science as well as the College of Engineering.

His dream career is developing computer systems and software that protect business infrastructures from cyber attacks.

"I'm really grateful for being awarded the Director's Fellowship, without it I couldn't be studying here," Chilano said.



# MOMINA

Hooked on the incredible power of computing as the 'bicycle for the mind,' Momina Haider wants to put technology to work advancing education and health.

When Momina Haider built her first MATLAB keyboard game freshman year of college, she knew she had discovered her passion.

"Such a small feat it seems now to create a game in MATLAB but the challenges it entailed at that time were somewhat thrilling," said Haider. "I feel the same thrill when I'm met with challenges in current projects at Carnegie Mellon."

Haider is a MSIT-Mobility student and a 2016 Director's Fellow. She earned her computer science degree in Lahore, Pakistan and chose the INI for its flexibility.

*"The incredible power of computing as the 'bicycle for the mind' is what drew my interest and continues to maintain it," she said.*

At the INI, Haider says she is constantly learning new things, not only technical but social, managerial and team work skills. Above all, Haider likes to build systems. She hopes to get involved in work that builds tools to help people in their everyday lives.

With an interest in psychology and enthusiasm for world cultures, fashion and mass media, Haider admits she does not consider herself to be a 'techie.'

"I know many women who do not enter the field because they feel they aren't 'techie' or 'geeky' enough," she said. "I think the impression that a good engineer must be a huge techie is misleading."

According to Haider, the Director's Fellowship made it possible for her to attend the INI. "I was over the moon at receiving such a wonderful opportunity to study amongst a global community to challenge myself, to grow and to achieve," she said.



Haider is a 2016 Director's Fellow.



# Securing a Future Career

INI and EWF celebrate renewal of 10-year partnership developing women leaders in information security and privacy.



 Hanley is the 2016 INI-EWF Fellow.

*“In this field, I want to go from retrieving and analyzing evidence after an incident has occurred to leading a team that prevents digital intrusions from happening,” said Hanley.*

**C**aitlin Hanley was first exposed to cybercrime during a high school exchange program in Germany. All it took was a few Internet searches while prepping for an English class presentation about chocolate. After wrapping up her research, Hanley was horrified to discover her computer had been infected with a virus.

“After many hours of frustration, I realized that I could not defeat the virus with my computer skills and knowledge,” she said. “The experience sparked a desire to learn how computers work and how they can break.”

Hanley is currently a Master of Science in Information Security (MSIS) student and is learning the exact skills she lacked when she got her first computer virus.


Her education is made possible through a full-tuition fellowship provided jointly by the INI and the Executive Women’s Forum (EWF). After 10 successful years, this partnership has been renewed and will continue to develop students like Hanley into leaders in information security and privacy.

“Our partnership with EWF is just one facet of the INI’s commitment to creating a nurturing and inspiring environment that promotes and celebrates gender and cultural equality,” said Dena Haritos Tsamitis, director of the INI. “Caitlin is an exceptionally promising student and this opportunity gives her the chance to fulfill her potential in the field of information security.”

## **ABOUT THE EWF INI FELLOWSHIP**

The INI has partnered with the Executive Women’s Forum to offer the INI-EWF Fellowship to graduate students. It supports full tuition costs in order to ease financial worries for these students. In addition, they gain access to mentors who have reached executive levels in their careers. This intense level support has helped to lift these scholars toward success.



 Pezeshkian is a 2016 Presidential Fellow.

# How I Got Here

Pouria Pezeshkian is looking to reinvent the world, starting with music. The 2016 Presidential Fellow balances graduate study with his role as co-founder and CTO of a music technology startup.

› When I launched Nebula Instruments, I was the only member of the company. Today we're a diverse team of 5 members, working together to create better musicians. Our product solves a major challenge in finding, creating and storing thousands of sounds – something that doesn't exist today.

› I wear many hats, some days I am helping to solve a software bug, another day I'm discussing the development of a marketing plan, or showing off our product to a focus group. That's only a snippet, all in all, being part of a startup is the most exciting role anyone could ask for, you're literally learning and applying on the go.

› Carnegie Mellon, plus running a startup, and collaborating on future ideas does take a few hours of the day.

› I'm a MS28 MSIN student. INI is one of the most unique programs I found that offered a unique balance of laser focus and flexibility in curriculum.

› I can tell the INI staff know the students well, and are a proponent of their interests and success. For me, that's entrepreneurship, and the excitement is well shared with our director, Dena Haritos Tsamitis.

› If you want to gain more knowledge and hands-on experience, this is your place. If you're inspired to make a difference in the world through innovation and hard work, then this is definitely your place.

## ABOUT THE PRESIDENTIAL FELLOWSHIP

An endowment of more than \$150 million has been established to support the Presidential Fellows and Scholars across all seven of CMU's colleges and schools. Presidential Fellows will be selected annually through a process overseen by the provost that invites nominations from department heads and deans of the schools and colleges at the university. By providing financial support to recruit and retain outstanding graduate students, these endowed fellowships ensure Carnegie Mellon remains a world-leader in education and research.

## MARTIN CARLISLE

**There's a new cybersecurity guru at Carnegie Mellon.**

For the past 20 years, Martin Carlisle has educated and trained the nation's future cybersecurity experts at the United States Air Force Academy. Now he is the INI's director of academic affairs and a teaching professor.



### What he's most excited about coming to INI:

- It's a great opportunity to work with really bright students and to think about how to advance how we teach computer security.
- I'm looking forward to K-12 outreach and getting people interested in computer security before they even come to college.
- There's an underrepresentation of women and minorities studying computer security. It's really about thinking differently about using systems, so you really want a diverse set of opinions so you don't miss things.

### His approach to teaching computer security:

- Imagine you were coaching a football team, and you were the defensive coach. If you never taught anybody about how the offense works, how could they possibly win at defense? The same thing is true in computer security.
- I formed a cyber-competition team at the Air Force Academy and one of the things that's really great about Capture the Flags (CTF) in particular is that it causes you to think about, "How do I do something that wasn't in the documentation? How do make a system do something interesting?"

## Faculty & Staff Updates

INI teaching professor **Martin Carlisle's** research on malware similarity, "CARDINAL - Similarity Analysis to Defeat Malware Compiler Variations," was presented at the IEEE Malware Conference on October 18, 2016 in Fajardo, Puerto Rico. The research described how to identify identical malware that had been compiled with different compilers or different compiler options.

**Alex Hills**, Distinguished Service Professor of Engineering & Public Policy (EPP) and the first INI director, has just published

his third book, *Finding Alaska's Villages: And Connecting Them*. Written for a general audience, the new book describes Alex's adventures traveling Alaska by bush plane and snow machine, braving extreme weather and rough terrain to bring telephone service to small villages across the big state, and later developing a new public radio station to serve the people of Alaska's huge northwest region.

**Limin Jia**, INI assistant research professor, received the Wimmer Faculty Fellowship for 2016-2017 from CMU's Eberly Center.

She also published "überSpark: Enforcing Verifiable Object Abstractions for Automated Compositional Security Analysis of a Hypervisor" in *Proceedings of 25th Usenix Security* (2016) and "Blame Assignment for Higher-Order Session Types" in *Proceedings of 43rd ACM SIGACT-SIGPLAN Symposium on Principles of Programming Languages* (January 2016).

**Jon Peha**, professor of EPP and Electrical and Computer Engineering (ECE) was invited to serve the U.S. State Department as a member of its Advi-

sory Committee on International Communications and Information Policy.

**Lorrie Cranor**, professor of computer science and of EPP, concluded her term as Chief Technologist at the US Federal Trade Commission in January 2017. While at the FTC, Cranor contributed to a wide variety of projects, including serving on the committee that drafted the White House's National Privacy Research Strategy, and organizing an FTC workshop on evaluating disclosures.

# Q&A

## with Professor Limin Jia

*What's one thing most students don't know about you?*

I come from Qingdao (sometimes spelled as Tsingtao) which is also the name of a Chinese beer sold in the US. The brewery was founded by the German settlers pre-WWI.

*What's the best piece of advice to offer graduate students?*

Start career building the moment you start your graduate school. Attending talks and conferences, meeting people, building connections and identifying your weaknesses and strengths are equally important as getting A's in your classes.

*What's your favorite CMU tradition?*

The Carnival in April. It's great to hang out with students, family, and friends, and eat funnel cakes.

*Did you always want to be a research professor?*

Both of my parents were academics. They brought me along to cool places when they went to conferences in the summer. I was convinced this is the best job in the world at a young age. I love the freedom to conduct research based on my interests. There are so many new and exciting ideas to pursue.

*Do you have any hobbies?*

I like biking, hiking and kayaking. I watched Pittsburgh July 4<sup>th</sup> fireworks on a kayak near the Point one year.

*What is your favorite part of being a professor?*

My favorite part is working with bright and talented students from all over the world and taking part in shaping their careers.



Limin Jia is an assistant research professor and advisor of Women@INI.

# What You Need to Know in 2017

Reconnect with INI by attending an upcoming event or share your story to be featured!

## April 21, 2017 INI Spring Carnival Events

**11:30 AM-12:30 PM**

### KEYNOTE

Valerie Plame: An Ex-CIA Operative's Take on Cyber Warfare

McConomy Auditorium, CUC

**1:00-2:30 PM**

### PANEL DISCUSSION

Why Culture Matters: The Challenges and Benefits of Cultivating Inclusion in STEM Fields

McConomy Auditorium, CUC



## Alumni Profiles

We are seeking those interested in being featured as an INI alumni spotlight. Take a look: [bit.ly/meetINIALumni](http://bit.ly/meetINIALumni)

Submit your information at  
 [bit.ly/INIalumni](http://bit.ly/INIalumni)

## Become a Mentor

The INI is launching a new alumni mentorship opportunity called **Firsthand**. It is a platform that connects alumni with INI students in an informal, one-on-one setting – entirely online!

“We selected Firsthand because it is easy to use. It only takes a few minutes to sign up as an advisor and the commitment itself is flexible and free,” explained Jennifer Feyrer, director of corporate and alumni engagement. “All communication is routed through the Firsthand system, which means your privacy is protected.”

*Help us make this network a success by volunteering to mentor a current student. Register to become an advisor:*

<https://cmuini.firsthand.co>



**HIRAL SHAH**

MS19 | Stanford MBA Candidate

“As an alumna, I feel it’s my duty to help mentor current students and have them succeed in their career. I believe this is the best way I can give back to INI, that helped me get to where I am today.”



**CHUAN HAN**

MS23 | Google Software Engineer

“I just signed up on the mentor platform! I am very grateful for the training and lessons received from CMU/INI. So I’d like to help the current students as well.”



**LinkedIn**™



### WAY TO GIVE BACK

Sharing your insights as a mentor is a valuable way to give back to the INI and Firsthand makes the experience incredibly simple and time-efficient.

### SIMPLE AND EASY

It takes only a few minutes to sign up, especially if you sync your LinkedIn profile’s data. The commitment is flexible: you decide how often you want to be contacted.

### PAY IT FORWARD

By mentoring INI students, you help to shape their future as alumni. The experience may inspire them to pay it forward as a mentor five or 10 years from now.

# Roseanne Silva From INI to CTO

The best advice **Roseanne Silva** (MS02) has ever received is to be a leader, not a follower. Her parents taught her that, and so that is what she has done, moving up the ranks over the past two decades to the position of Business Chief Technology Officer (CTO) at PNC Financial Services Group.

Raised in St. Paul, Minnesota, home of SPAM, Wheaties and more than 10,000 lakes, Silva got hooked on a career in information technology after a high school programming class. She studied electrical engineering at the University of Minnesota and relocated to New Jersey to work at Bell Communications Research (Bellcore). That is how she ended up in one of the first cohorts of INI students, graduating in 1991 with a Master of Science in Information Networking (MSIN).

“What my family thinks I do is ‘fix computers,’” she said. In reality, it is a little more complex. She now leads a team within the technology infrastructure services (TIS) team at one of the nation’s largest banks, ensuring a recoverable, scalable and secure technology infrastructure, from firewalls and servers to messaging tools and mobile devices.

“In the financial services industry, we are under increasing pressure to meet the demands of our customers to provide faster, easier and more transparent solutions,” she said.

After over 25 years living and working in Pittsburgh, she says what she loves most are the rivers, bike trails and neighborhoods. “Mr. Rogers was right, there are amazing people in his neighborhood!” she said. Silva enjoys biking, hiking and kayaking, and is a volunteer trip leader for Venture Outdoors (VO). Her all-time favorite activity is leading fireworks paddles on Pittsburgh’s rivers.

Silva currently serves as the president of the INI’s Alumni Leadership Council and is a CMU Legacy Scholarship Donor.



**“FOLLOW YOUR  
PASSION, NURTURE  
A NETWORK OF  
MENTORS AND  
ALWAYS BE OPEN TO  
FEEDBACK.”**

# CLASS NOTES

Good news in the lives of INI alumni around the world

Want your good news shared? Submit your information at [bit.ly/INIclassnote](http://bit.ly/INIclassnote)



## CAREER MOVE

**Wei-Kuang (Edward) Lee, MS22**  
Joining Google's cloud team as Security Technical Consulting Manager.

**Pushkar Joshi, MS22**  
Joining Apple as a Software Security Engineer.

**Keith Hawkins, MS01**  
Joining Bloomberg LLC as a senior engineer after 16 years with Goldman-Sachs.

## ENGAGEMENTS

**Roseanne Silva, MS02**  
Engaged to Michael Tonkin in 2016.



Roseanne Silva

## RELOCATION

**David Pearson, MS23**  
Relocated to Rochester, NY area with his wife Jenny and their two dogs, Gracie and Keiki.

## BIRTHS

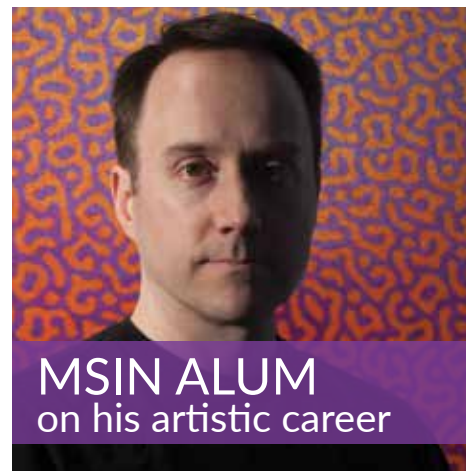
Baby boy, Soma, on 2/1/16.  
**Yuki Nishida, MS24**

Baby boy, Rishaan Bose, on 8/29/16.  
**Rupsha Chaudhuri, MS18**

Baby boy, Sosuke, on 3/10/16.  
**Takayoshi Fukaya, MS23**



Sosuke



MSIN ALUM  
on his artistic career

After eight years working as a software engineer at the management level, first at Bellcore and later CNET, **Andrew Werth (MS03)** decided to make a change. He moved to New York City and discovered a passion for art. Today, he creates paintings best described as "organized, organic abstraction."

"Each painting is constructed through a slow, deliberate process that consists of applying thousands of individual brushstrokes one at a time," he said.

*Many of Werth's paintings are composed around "Turing Patterns."*

Famed British mathematician Alan Turing proposed that a process of "reaction-diffusion" is likely responsible for some of the pattern formation found in nature, such as the stripes on a zebra or the spots on a leopard. Werth simulates that process on the computer and uses the resulting patterns as the starting point for some of his paintings.

"Trying to 'build' a painting that will be intriguing and different and hold up over time also requires some of the same design skills and out-of-the-box thinking that is helpful in computer science," added Werth.

Most recently, his work was selected by the Monmouth Museum as part of their New Jersey Emerging Artists Series in summer 2016.



Abhinava Sadasivarao

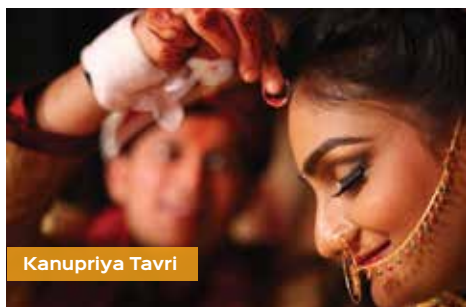
## MARRIAGES

**Kanupriya Tavri, MS21**  
Married Anuj Bansal on 2/26/16.

**Abhinava Sadasivarao, MS22**  
Married Sountheriya on 11/6/16.

**Vikram Nair, MS26**  
Married Roopam Nair on 12/9/16.

**Vignesh Gadiyar, MS24**  
Married Niveditha Shenoy on 12/19/16.



Kanupriya Tavri

## JOB PROMOTIONS

**Devika Nair Syama, MS24**  
SENIOR PRODUCT MANAGER,  
Amazon Web Services

**Kalpna Chatnani, MS19**  
VICE PRESIDENT, Bank of America





## The First INI Baby



The INI's first class proudly sported their "gINI Pig" nickname on their softball team uniforms.

The son of two "gINI Pigs" considers following their footsteps to Carnegie Mellon.

After Bellcore hired **Sin-Kuen Hawkins** (MS01) and **Keith Hawkins** (MS01), the future husband and wife were invited to attend the newly formed INI. In 1990, they graduated from Carnegie Mellon with their master's degrees in information networking.

Their first date was at the Squirrel Hill Eat'n Park and 27 years later, they had the chance to revisit the spot and reminisce on the INI's early days. The family returned to Pittsburgh this past summer to tour CMU's campus with their son Matt, who is applying to study engineering at their alma mater.

The students of INI's first class affectionately dubbed themselves "gINI pigs," a play on the idiom of guinea pigs being used to test new ideas, and quickly became a tremendous network of support for one another while navigating the challenging curriculum.

"What I remember most is the camaraderie of that first class. We were all in it together," said Keith. "The curriculum was very demanding and so we became like foxhole buddies helping each other learn the material. Many of our classmates became life-long friends."

*"Back in 1989, the INI really was one of the first interdisciplinary programs," said Sin-Kuen. "In some ways, we felt like we were pioneers."*



Today, the Hawkins live in Colts Neck, New Jersey with their two sons. Sin-Kuen is a part-time project manager for the Institute for Electrical Engineers (IEEE) and Keith is a senior software engineer for Bloomberg.



# Invest in the INI

The success of the INI is a credit to the strong network of generous donors - alumni, students, parents, faculty, friends and staff - who give back and make a real difference.

In this edition of *The Network*, we spotlighted six INI students whose education at Carnegie Mellon was made possible through the generosity of donors. If you were inspired by Caleb De La Cruz's journey from the Dominican Republic to Pittsburgh, Patricio Chilano's commitment to fighting cyber crime or Momina Haider's desire to build products that improve lives, consider making a donation to support the education of future INI students.

Your investment in the INI enables us to attract and enroll the brightest students while enhancing the academic and student experience. Only then can we pioneer the innovative and collaborative initiatives for which the INI and Carnegie Mellon are known.

*"I would not be where I am today if it wasn't for the generosity of donors. I would like to pay it forward and give others the same opportunity."*

**Erye Hernandez, MS25**  
Malware Research Engineer,  
Palo Alto Networks

## Investment Opportunities

### *Institute Naming*

- INI Building
- Interview Room
- Project Room
- Interactive Studio Area
- Interactive Teaching Cluster
- DEC @ CIC and DEC @ Henry

### *Expendable Fellowships*

- INI-EWF Fellow Fund
- Graduate Student Fellowship Fund
- INI Strategic Fund
- Named Graduate Legacy Fellowship

## Endowment Opportunities

- Joyce Brocaglia - EWF Endowed Fellowship
- Strategic Initiative Endowment Fund
- Innocent Habiyaemye Memorial Award

## Two Ways to Give

**Online:** [giving.cmu.edu/INImag](http://giving.cmu.edu/INImag)

**By Mail:** Fill out the Giving Envelope contained in this magazine.





 The Class of 2016, the MS26s, graduated on May 15, with Cisco Vice President and Chief Privacy Officer Michelle Dennedy as the key-note speaker.

# 5 things every alum should do

## 1. Connect on social media:

 INI Alumni

 [bit.ly/linkedinINI](https://bit.ly/linkedinINI)

## 2. Attend upcoming INI events.

Spring Carnival weekend is packed with special INI events on Friday, April 21, including a key-note talk by Valerie Plame, ex-CIA operative, and a diversity-focused panel discussion.

## 3. Join your local chapter.

Get involved with CMU alumni near you by joining a local chapter: [cmu.edu/alumni](https://cmu.edu/alumni)

## 4. Get involved in the Alumni Leadership Council (ALC).

Formed in 2010, the ALC's mission is to engage and strengthen the INI alumni network and help INI achieve its strategic goals.

Contact Roseanne Silva to learn more: [rkatsilva@gmail.com](mailto:rkatsilva@gmail.com).

## 5. Invest in the INI.

To those who have made a gift to the INI, thank you. To those who have not yet done so, consider contributing to an INI fund and make a Carnegie Mellon education possible for another student.

## Why I give to the INI:

I give so that others can receive a great education that will allow them to fulfill their dreams.

Marachel Knight (MS07)  
AT&T, Vice President-Advanced Technology  
Planning and Realization

## Why I give to the INI:

Giving for me is still to participate in what was a great experience: studying at the INI.

Luca Zoia (MS22)  
United Healthcare Group, IT Security Architect

 **Questions?**  
Contact Jennifer Feyrer  
Director of Corporate and Alumni Engagement  
[jfeyrer@cmu.edu](mailto:jfeyrer@cmu.edu) | 412-268-9292

# #inigram

Share your INI photos on social media using our hashtag: #inigram!



Good food and good times as the graduating class (MS26s) gathered for **GOINI's Spring Picnic** in Schenley Park.



Dean Jim Garrett talks with prospective INI students at the 2016 Open House.



MS28s enjoyed a beautiful evening on Pittsburgh's three rivers during the annual **Orientation Boat Cruise**.



INI staff built a Lego bridge dressed as Bob the Builder during the INI team's "**Building Our Bridges**" presentations.



INI students presented their "Mindful Yoga" app at the **INI Student & Alumni Showcase and Networking Reception** during Spring Carnival 2016.



**Divya Balasubramanian (MS26)** hugs her father after receiving the Innocent Habiyaemye Memorial Award at the 2016 graduation ceremony.