

**Carnegie
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Information
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Institute

The Network

INFORMATION NETWORKING INSTITUTE



SPRING 2022 • ANNUAL MAGAZINE

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ANNUAL MAGAZINE SPRING 2022

The Network is published annually for alumni, students, faculty, staff and friends of the Information Networking Institute (INI) at Carnegie Mellon University (CMU).

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WWW.INI.CMU.EDU

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The INI Looks to Its Changemakers to Reimagine the Future

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Will you join me
in reimagining
the future?

A LETTER FROM THE DIRECTOR



While the world has changed at a record pace over the past year, I'm inspired by how you—our INI alumni, students, faculty, staff, partners and friends—have adapted in the face of challenges posed by the COVID-19 pandemic. CMU and the INI returned to in-person learning for the 2021-2022 academic year. I was proud to see colleagues and students back on campus and stronger than ever. In my last letter, I encouraged you to reimagine the future rather than wait for it to simply happen. In this issue, I call upon all of us to take the next step by becoming the changemakers who make our visions a reality.

At the INI, our initiatives have continued to grow. We are actively engaged with the city through our Pittsburgh Strategy to support a synergy of vision and talent with local officials, stakeholders and innovators.

We have expanded our curricular offerings. This fall, I am excited to launch our Master of Science in Artificial Intelligence Engineering – Information Security (MSAIE-IS) program in Pittsburgh, another example of our commitment to make an impact and prepare students to lead advanced technologies. We are exploring options for continuing education and flexible programming.

Three new faculty members joined the INI this year and brought a wealth of industry knowledge and technical experience. Another new faculty member will begin in the fall. Our faculty are the backbone of the exceptional education we offer at the INI. They are responsible for providing students with the necessary skills to solve real-world problems, which is a hallmark of all our programs.

Importantly, we have begun to form our new 2022-2027 Strategic Plan to stay ahead of change. Along those lines, a planning committee of INI stakeholders and partners formed to help position the INI to achieve new goals and make significant impact in Pittsburgh, Silicon Valley and beyond.

The INI has indeed shown resilience. We welcomed our largest class of students last fall who are already applying themselves to make new ideas a reality. As the world moves forward, we are not just moving with it. We are shaping where it goes.

The INI community has the talent to build solutions to the challenges facing our society and improve the systems that we rely on in our daily lives.

A vital resource is our global network of alumni, whose work brings about meaningful, positive change and inspires our students to do the same. This issue is dedicated to you, our Changemakers. Your visions shape the future!

Dr. Dena Haritos Tsamitis

*Barbara Lazarus Professor in Information Networking
Director, Information Networking Institute (INI)
Founding Director, Education, Training and Outreach, CyLab*

The INI Looks to Its Changemakers to Reimagine the Future

by Deana Lorenzo

Now more than ever, the world needs changemakers who will reimagine the future. This issue of *The Network* explores how members of the INI community use their time, talents and resources to effect meaningful change in today's complex reality.

The INI is fortunate to have a talented network of 2,400+ alumni who embody the spirit of what it means to be a changemaker. Our last issue highlighted just a few examples, including business chief technology officer and CMU Alumni Service Award recipient **Roseanne Silva '91**, and tech entrepreneur and company founder **Panagiotis Zikos '03**.

But at the INI, one does not have to wait to graduate to make a difference. This is a point that INI Director **Dena Haritos Tsamitis** drives home at the beginning of each academic year.

"You are developing knowledge and skills that have the power to change society and improve the lives of those who have been affected by this pandemic," Haritos Tsamitis said in her fall orientation address to the MS33 class—INI's largest incoming cohort. "I encourage you not to wait until graduation to have an impact—being a changemaker starts at the INI."

Being a changemaker means embracing a changing world

The pandemic has changed everything about the way we study, work and interact with one another. Graduate students were deeply impacted by the switch to virtual and hybrid modality, making an already challenging academic endeavor that much more difficult. One of the formative aspects of grad school are the connections you make with faculty and peers. Even as campuses transition back to in-person modalities, navigating the highly collaborative nature of the graduate experience now requires a certain kind of creativity.

INI students are known for thinking outside of the box and engaging beyond the classroom. They do this by presenting research or leading workshops at diversity-focused conferences, taking leadership roles with WINI or GOINI or participating in Capture-the-Flag (CTF)

THE INI LOOKS TO ITS CHANGEMAKERS TO REIMAGINE THE FUTURE

competitions that help advance the field of cybersecurity training. ► *Learn more by reading about cybersecurity faculty on page 16.*

During COVID-19, many major events that would have otherwise been held in-person went online. Despite the challenges, INI students adapted to the virtual ecosystem and continued to pursue opportunities to engage and network, some even preferring the increased flexibility and accessibility that remote delivery allows.

MSIT-IS student **Weijia Yan** '22 had no idea what to expect when she decided to attend the Women in Cyber Security (WiCyS) virtual conference in 2020, but she was glad she did. "Despite being a virtual conference, the organizers did a great job making it interactive and fun," she said. "I was able to connect with professionals throughout the U.S., meeting with them in person later on."

WiCyS, which draws thousands of students and professionals of all genders and backgrounds each year, is one of those not-to-be-missed events in the tech community. It was at WiCyS the following year when Yan realized that she wanted to continue her studies at the INI. "I received a conference scholarship to attend WiCyS 2021 and met with INI students, staff and faculty," she said. "When I received my acceptance letter, it was a dream come true."

When WiCyS was held in-person the following year, a group of INI students and an alumna hosted a workshop for CyLab's picoCTF initiative, a platform designed to make cybersecurity education more fun and accessible to people of all ages across the globe. The workshop was a hit at the conference, drawing over 150 participants.

"We understand the educational value that these [Capture-the-Flag] events offer to enhance and polish cybersecurity skills," said INI Assistant Teaching Professor **Hanan Hibshi** '11, who serves as faculty advisor to picoCTF. "The CMU team

Women in Cyber Security (WiCyS)



INI students greet visitors at the booth at the WiCyS conference in Denver last fall.



INI students, staff and faculty attend the WiCyS 2022 conference in Cleveland last spring.

THE INI LOOKS TO ITS CHANGEMAKERS TO REIMAGINE THE FUTURE

made an impact during WiCyS and helped encourage many amazing, bright women to start using CTFs as a skill-building tool.”

WiCyS is just one of the 18 industry and diversity-focused conferences the INI sponsored in 2020-2021, which also included Tapia Celebration of Diversity in Computing, Grace Hopper Celebration of Women in Computing, Cybersecurity Games & Conference (CSAW), BSides Pittsburgh and others. These community-oriented partnerships have always been central to the INI’s mission and values and will continue to grow under the strategic plan.

“Studies show that teams that invest in diversity and inclusion tend to be more adaptive and effective in the long run,” said Haritos Tsamitis. “And this is exactly what we need going forward.”



Practicum Project

Bicoastal information security and mobility students work alongside industry, research and government sponsors on a semester-long capstone project at CMU Silicon Valley. Projects span a variety of topics in computing, mobile systems and security, and range from fundamental research to software development.

Responding to a new reality and a changing industry

For Haritos Tsamitis, the future of work and the future of the INI and its programs are closely linked. “The next generation of technology professionals are less likely to gravitate toward typical 9-to-5 jobs,” she said. “To be competitive, organizations must prepare for workforce disruption using lessons learned during this pandemic.”

One of the ways the INI is helping students prepare for the future of work is by expanding its faculty. This past year, three new faculty were hired, with a fourth starting in Fall 2022. ▶[Read New Faculty Q&A on page 28 to learn more about them.](#)

They are not only increasing curricular breadth and depth, but they are also involved in building strategic opportunities to serve nontraditional students in the technology workforce.



First Place Overall

*Carnegie Mellon University’s Plaid Parliament of Pwning, advised by **Maverick Woo**, took first place at the MITRE Embedded Capture the Flag (eCTF) competition. The team included seven students from the INI.*

The eCTF is an embedded security competition run by MITRE in partnership with Riverside Research that puts participants through the experience of trying to create a secure system and then learning from their mistakes.

Joanne Peca joined the INI in Fall 2022 as an associate professor of practice, assuming the role of INI associate director the following semester. As associate director, she will play a direct role in building INI's industry-facing initiatives, such as the internship experience and practicum. Peca will continue teaching and advising students, while building relationships with the members of Pittsburgh's technology community.

"It's not often you find an intensely technical program that also appreciates the connection to other disciplines," she said. "If you're a CIO or CISO looking to hire someone who can understand policy *and* build the solution you're looking for—INI students are a great fit."

Prior to joining the INI, Peca served as Penn State Altoona's Chief Information Officer and was named Pittsburgh Technology Council's Non-Profit CIO of the Year in 2019. As an information security practitioner and former CIO, she understands what it takes to be a changemaker in this industry.

"INI students get that technology doesn't exist in a bubble," said Peca. "Our programs are rigorously technical but also infused with business concepts and risk management so our students can speak both tech and business."

Through innovative faculty, adaptive curricula, unmatched support services and hands-on learning opportunities, the INI is helping the next generation of technology professionals thrive in a changing world. As you'll read in these pages, our students and alumni respond to problems with thoughtful solutions, create and test bold new ideas and give back to their communities in meaningful ways.

The world needs more changemakers and being a changemaker starts at the INI. 🍷

The Network Is Calling

Mark your calendars for these upcoming events.

The Diana Initiative

August 10–11, 2022

The Westin Las Vegas
Las Vegas, Nevada

The Diana Initiative is a conference committed to helping those who are underrepresented in information security. The INI is a proud 2022 sponsor.

DEF CON

August 11–14, 2022

Caesars Forum, Flamingo,
Harrah's, and The LINQ
Las Vegas, Nevada

DEF CON is the largest hacking and security conference, featuring presentations, workshops, contests, villages and the premier Capture the Flag contest. The INI is a 2022 vendor.

TAPIA Conference

September 6–10, 2022

Marriott Marquis and Washington
Convention Center
Washington, D.C.

The goal of the Tapia Conferences is to bring together undergraduate and graduate students, faculty, researchers and professionals in computing from all backgrounds and ethnicities. The INI is a proud 2022 sponsor.

Grace Hopper Celebration

September 20–23, 2022

Orange County Convention Center
Orlando, Florida

The AnitaB.org flagship event brings the research and career interests of women in computing to the forefront, and highlights the contributions of women to the tech world. The INI is a proud 2022 sponsor.

“Leave Your Comfort Zones Behind”

WINI co-founders inspire graduates at 2022 INI Diploma Ceremony

by Deana Lorenzo



On May 15, 2022, the INI held its annual graduation ceremony, a time-honored tradition that brings together graduates and their families from around the world to celebrate their hard-earned master’s degrees from Carnegie Mellon University.

Graduation is a momentous occasion in and of itself, and there was even more reason to celebrate as this year was the INI’s first in-person diploma ceremony since 2019. The 73 graduates of the Class of 2022 were recognized along with the 285 graduates of the Classes of 2021 and 2020 at Rodef Shalom in Pittsburgh, while friends, family and supporters cheered them on.

In her remarks, INI Director **Dena Haritos Tsamitis** referenced the incredible moment in history in which her students—now alumni—were living. They defied the odds and demonstrated remarkable resilience and grit to successfully finish their degrees during a global pandemic.

“You are poised on the threshold and ready to reshape the future,” she told them. “Waiting for things to return to normal was not the path you chose. You chose to reimagine your future.”

New graduates are entering the workforce during a challenging time, but these challenges bring opportunities to make a difference. Haritos

Tsamitis knows from personal experience that in order to have a positive impact, you must be willing to leave your comfort zone.

“[As] a woman in a male-dominated field at a time when women were not necessarily welcome and a single mother in the workplace—my seat at the table never felt comforting,” she said. “But I imagined a better future for myself and my children as my parents did before me. I want to pass on that encouragement to you.”

While determination and perseverance are key factors to success, Haritos Tsamitis reinforced the importance of building networks. “I hope you continue to show empathy to others, too, because the future of technology depends on what makes us human.”

Before introducing this year’s commencement speaker, Haritos Tsamitis left students with this advice: “chase your dreams with tenacity. Stay out of your comfort zone and keep thinking big.”

2022 INI DIPLOMA CEREMONY

*“Stay out of your comfort zone
and keep thinking big.”*



(left) WINI co-founders Haritos Tsamitis and Wang at the first WINI event in 2005; (right) at the graduation reception in 2022.

Next, **Dr. Chenxi Wang** addressed the graduates. Wang is the founder of Rain Capital, a Silicon Valley-based venture fund that invests in disruptive technologies. Before starting her own business, she was a CMU faculty member in Electrical and Computer Engineering with close ties to the INI; in 2005, Wang and Haritos Tsamitis founded Women@INI (WINI) an active student organization that seeks to advance gender diversity and inclusivity in technology.

To become the founder, technologist and industry leader she is today, Wang had to overcome a feeling that nearly all people—no matter how successful they are—struggle with at some point in their careers and lives: self-doubt.

“The idea of starting a business had crossed my mind many times, but I never took action before because there was always that little voice at the back of my head that was asking, ‘can you do this? Are you good enough? What if you fail?’ she said. “I’m here to tell you that that voice will be there all the time.”

That voice is the fear of uncertainty—not knowing what your future will hold. Wang advised the graduates to not let that fear stop them from realizing their full potential.

“Your future is unknown, but this is also the greatest strength that you have, because you get to define it however you want. As long as you don’t let that voice at the back of your head take hold of your destiny.”

There has never been a greater need for the skills and knowledge that INI graduates possess. Noting current trends in hot button issues such as cryptocurrency, big data, privacy and cyber defense, Wang told the graduates that their time is now.

“Next time you have to make a decision that takes you out of your comfort zone—stare down that voice, push it aside, and charge forward.”

“Don’t let that voice at the back of your head define what you do.” 🍷



Antonio Martorana '22 addressed first-generation scholars at the CMU FIRST Together Commencement.



Martorana, who graduated from the INI with an MS in Information Technology - Information Security (MSIT-IS), spoke at CMU's graduation reception for first-generation university students, hosted by the Center for Student Diversity and Inclusion.

"If you're looking to make an impact, the best thing you can do is enable others so that they can try to be great at whatever they want to do," he said.

Martorana is a GEM Fellow and member of the Society of Hispanic Professional Engineers (SHPE). During his time at the INI, he served as vice president of GOINI and competed with CMU's award-winning hacking team, Plaid Parliament of Pwning (PPP).

Congratulations to this year's INI Student Award recipients:



Executive Women's Forum INI Fellow:
Ruchi Banerjee



INI Leadership Award:
Sears Krieger Schulz



Innocent Habiyaremye Memorial Award:
Dianelys Soto Cruz



Outstanding Student Services Award:
Nikhil Lalit Vanjani



Outstanding Student Services Award:
Saurabh Pathak

Thinking Outside of the Box with Offsyte

Alumna Emma Guo '10 leveraged the changing workplace to transform the corporate teambuilding experience.

by Deana Lorenzo and Omasan Richardson



Back in 2019, **Emma Guo** was planning an offsite event with her coworkers in the San Francisco Bay Area when something clicked.

"I always loved going to these team events but finding new offsite ideas and actually booking them was a real pain, every single time," she wrote in her company blog, *Offsyte Insights*¹.

"It was pretty surprising that there was no online marketplace, no one-stop-shop, where teams could explore, compare and book these events."



This realization was the spark that ignited Guo's entrepreneurial journey, one that started as a bicoastal student at the INI. Being able to complete her program at the Mountain View campus gave her early access to tech companies and startups in Silicon Valley. After graduating from the INI in 2010, Guo worked as a software engineer and then engineering manager at a few different tech companies. After joining Lyft, she learned the importance and impact of having a great team culture.

Guo began exploring how to build a marketplace for in-person teambuilding events. She left Lyft in December 2019 to focus on her new company—Offsyte—full-time.

The company was set to launch in spring 2020, when the world changed. The global COVID-19 pandemic forced offices to transition to remote operations practically overnight. With in-person events out of the question, the pandemic threatened to derail the launch.

¹ <https://www.offsyte.co/blog>

THINKING OUTSIDE OF THE BOX WITH OFFSYTE

Instead, Guo saw an opportunity to grow: “We quickly pivoted to focus on virtual team events because it was clear that in-person events wouldn’t be back for a long time.”

Having already acquired vendors and developed the prototype, Guo and her team leaned hard into transitioning their platform to virtual offerings. Offsyte officially launched in the summer of 2020, just a few months behind their initial launch date.

“Whether it’s a virtual cooking class that ships ingredients to everyone before the event or an online escape room, we have it all,” wrote Guo. “In addition to discovery and booking, our platform simplifies the coordination required for sending kits to all of the participants – a new pain point created by virtual events.”

Despite deviating slightly from the original plan, Offsyte’s launch that summer was timely. Hosting authentic and creative teambuilding experiences became difficult during the pandemic but it also became vital. It preemptively

addressed companies’ concerns about engaging their teams in a remote workplace.

“Employee engagement translates to productivity and happiness,” said Guo. “It’s way more than just about having fun...I think for every company to be successful, it’s more than just recruiting, recruiting, recruiting. You can recruit people, but what are you doing to help them grow their career and make sure employees “Don’t burn out.”

This belief is the core of Offsyte’s mission. In her company’s blog, Guo cited a Gallup research study which showed that companies with the highest levels of employee engagement outperformed those with low levels of engagement by a margin of 22% in profitability and 21% in productivity.

That’s because the nature of work is becoming more collaborative, according to one of the company’s blog posts, “10 Office Collaboration Stats You Should Know.” For example, a Microsoft survey suggests that collaborative work makes up



THINKING OUTSIDE OF THE BOX WITH OFFSYTE

as much as 80 percent of employees' time.² What's more, a Dimensional Research study shows that 83 percent of employees depend on technology to collaborate.³

Offsyte's services proved highly effective and in high demand. "By the end of the year, with \$0 spent on marketing, we had hosted more than 10,000 people from over 150 different organizations ranging from early-stage startups to Fortune 500s, non-profits, and universities," wrote Guo. "Thousands of cooking kits, mixology kits, game kits and fitness kits had been shipped to teams located all over the world."

Even Offsyte's own team benefits from the services they offer. "Everyone is very close to our product. We've done a ton of different events—murder mysteries, escape rooms, magic shows," she said.

The process of finding, vetting and booking company events can be cumbersome and time consuming. From the start, Guo and her team understood how important it was to automate this process, which is why Offsyte's self-service platform enables users to do all those tasks in one place.

If you head to Offsyte's website today, you will see an extensive menu of virtual and in-person team events. In many ways this reflects the future of workplace culture—one that can adapt, respond and innovate to help people thrive in a changing world.

The company now offers in-person events in the San Francisco Bay area, but virtual events remain at their core. "I think companies are realizing that you can't just snap back to five days a week in the office. So a lot of teambuilding events shifted



to virtual. It's more inclusive to everyone regardless of where they are," explained Guo.

Although it can seem daunting, being able to pivot and adapt to unforeseen circumstances is a part of leading a company, and something Guo strives to embody as CEO.

"One of the most important things I learned from INI was the ability to learn things quickly," she said. "Because throughout my career—whether as an engineer, or manager or now as a founder—there's always things you don't know, and I feel like I'm learning every day. The ability to figure out how to handle the task at hand is important."

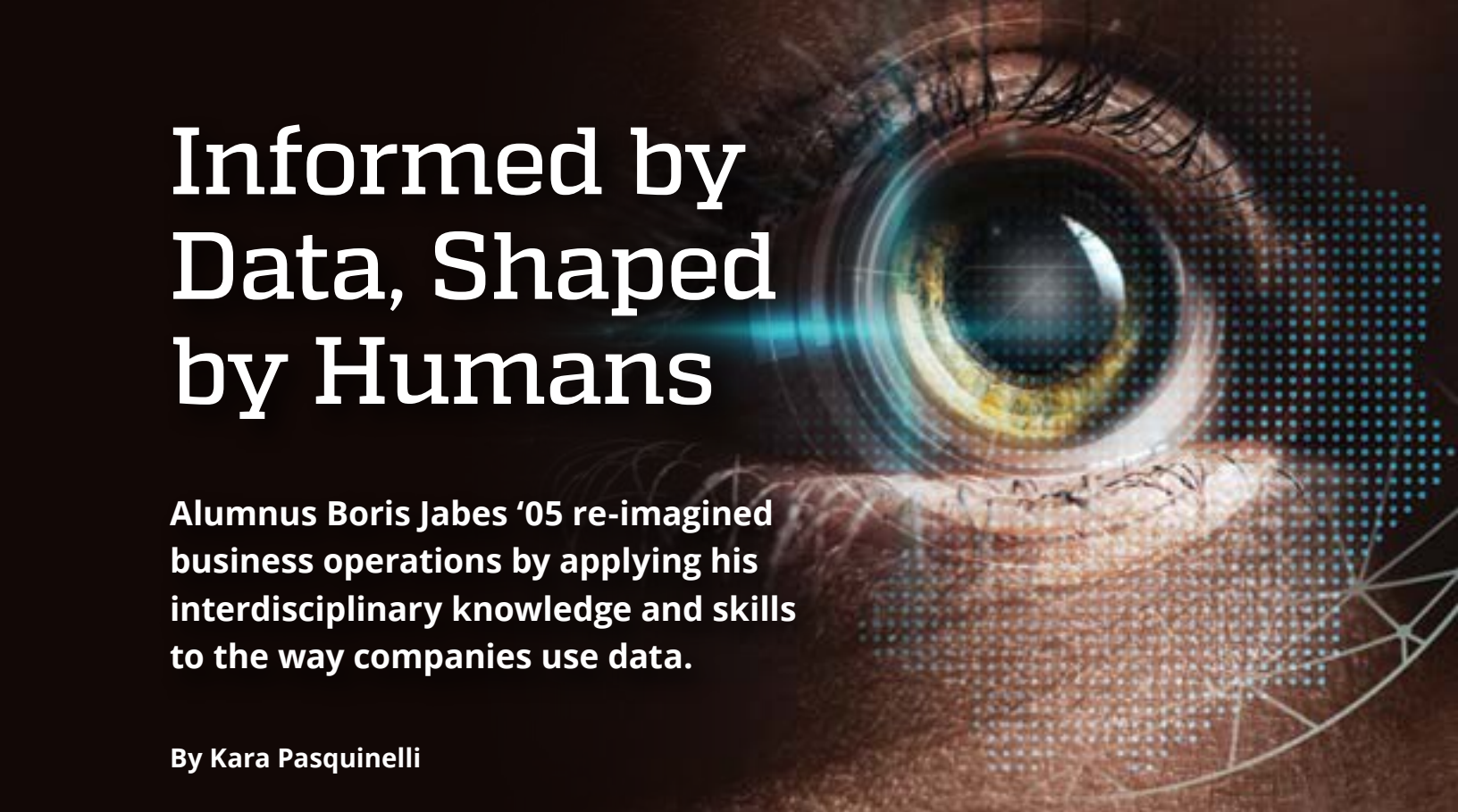
The other important lesson Guo took away from her time at the INI was the value of connecting and sharing meaningful experiences with her peers. She recalls taking the CMU shuttle on Henry Street after a late night of studying at the INI: "It was always packed—a lot of students at INI studied late. It was really fun and motivating to study with a group like that."

These are the types of teambuilding experiences she hopes to facilitate through Offsyte—interactions that not only bring people together but also create the foundation for a resilient and inclusive work environment. Emma Guo and her team at Offsyte see this future and are working hard to make it a reality for everyone. 🍷

² <https://www.microsoft.com/en-us/microsoft-365/blog/2018/04/19/new-survey-explores-the-changing-landscape-of-teamwork/>

³ <https://www.alfresco.com/whitepaper/collaboration-trends-and-technology-survey-knowledge-workers>

Informed by Data, Shaped by Humans



Alumnus Boris Jabes '05 re-imagined business operations by applying his interdisciplinary knowledge and skills to the way companies use data.

By Kara Pasquinelli

Entrepreneur **Boris Jabes** founded Census in 2018. The company has built a platform that synchronizes analytics from data warehouses into any business application. Census has skyrocketed to success, serving hundreds of customers, and growing from 10 to 60 employees in the past year.

“Integrating data between applications is an old idea but what makes Census different is that it federates data from a central system—the data warehouse. With a central source of truth accessible to anyone, Census helps more people get data they trust in order to move their business forward,” Jabes said.

His career began at Microsoft, where he built developer tools, after which he co-founded his first startup, Meldium, a ground-breaking account and password manager for teams backed by Y Combinator. LogMein acquired Meldium in 2014. Once again amid a larger organization, Jabes noticed that too many of his colleagues lacked access to good data.

By the late 2010s, companies were pooling all their data into large-scale data warehouses for analysis. However, none were delivering their insights into the hands of the people who needed it on the front lines of the business. Business intelligence teams had the data but analyzing it and reporting on company performance was a slow and asynchronous process detached from day-to-day operations. For example, when a salesperson wanted to get in touch with one of their users, they had none of these crucial data about their engagement.

Jabes knew what he needed to do: connect these disparate teams. “The INI opened me up to a multi-disciplinary approach to education

INFORMED BY DATA, SHAPED BY HUMANS

and problem-solving. While there, I studied and worked on projects that spanned the domains of computer science, engineering, economics, game theory and even the world of games and entertainment (ETC)," Jabes explained.

Census allows companies to deliver the data and analyses their teams need immediately. With Census, a salesperson can know who on their list of thousands of clients is the best person to get in touch with that day.

"Census puts the data into applications so that teams can automate their business operations. You're no longer limited to examining charts to look back on your company's performance. You can use the data in real-time to improve your product and customer experience."

Jabes has managed to navigate his company through the rocky waters and continue growing. He attributes his success as a founder to "being humble. You need to keep learning. Don't ever think you know everything."

Led by Jabes, the company reimagined the future of user experience by creating the world's first reverse ETL for cloud data warehouses. In a world of ever-increasing data, we will need changemakers like Jabes to make the business world manageable. 🍷



Boris Jabes, CEO at Census

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Spotlight on the INI's Cyber Forensics Faculty

by Ann Lyon Ritchie

Cybersecurity students thrive at the INI, in part thanks to the faculty who are affiliated with The CERT Division at Carnegie Mellon University's Software Engineering Institute (SEI).

"The INI values what SEI and our interdisciplinary partners at CMU bring to our curricular offerings. Through CERT, the INI connects to faculty whose approaches to teaching cybersecurity and problem-solving are applied at the highest levels of military, corporate and government organizations. Students receive the preparation to acquire a professional mindset," said INI Director **Dena Haritos Tsamitis**.

The INI's Cyber Forensics Incident Response (CyFIR) track prepares students in information security and digital investigations. The track's four courses are Applied Information Assurance (AIA), Host-Based Forensics, Network Forensics and CYFIR Capstone.



For five years, **Matt Kaar '06**, INI faculty and CERT cybersecurity exercise developer and trainer, has been teaching AIA with CERT co-instructor **Chris Herr**.

Students must complete simulated exercises, as individuals and in small teams, to practice the techniques they will encounter after graduating and taking their first job.

"The CyFIR track places INI students in realistic scenarios to teach them how to think through complex cyber problems.

And this close proximity to a cutting-edge research organization gives INI students a huge leg up when preparing for their own successful careers in cybersecurity."

Matt Kaar

"Experiential learning is a fundamental part of understanding how things work, and this is as important with cybersecurity as any technical discipline. And it is especially important when you make mistakes to learn from them. There is no better place to do that than in AIA, so you are battle-tested when entering the cyber workforce after the INI," Kaar said.



Gabriel Somlo, INI faculty and CERT senior cybersecurity engineer has co-taught Network-Based Forensics, with his CERT colleague **Adam Welle** since 2016. They

created the course materials from scratch and make updates with each iteration.

Each class follows the structure of a short lecture, followed by a demonstration in a simulator, and then discussion. Students receive a homework assignment and use the same simulator on their laptops to apply what they learned during class.

“CERT has been at the forefront of education in cybersecurity ever since the Morris Worm in the 1980s,” Somlo said. “CERT has name recognition. Importantly, we have a lot of practical tools and skills to teach INI students.”

The CERT reputation and know-how attract vital partnerships with industry and government to further cyber workforce development.

Kaar, in addition to teaching and research, leads SEI’s involvement in The President’s Cup, the first cybersecurity competition focused solely on the U.S. federal workforce. Established by a presidential executive order in 2019, it seeks to find the best cyber practitioners in the federal executive workforce. The SEI has led the engineering and execution of the competition every year since.

“The CERT Division at the Software Engineering Institute employs talented researchers and engineers across a variety of cybersecurity disciplines. By staying ahead of sophisticated threats and vulnerabilities, CERT works with sponsors to improve their defenses as well as help respond to incidents when they occur,” Kaar said. “CERT instructors at the INI bring this same mindset to their courses. The CyFIR track places INI students in realistic scenarios to teach them how to think through complex cyber problems. And this close proximity to a cutting-edge research organization gives INI students a huge leg up when preparing for their own successful careers in cybersecurity.” 🍷

OUT OF OFFICE WITH ROTEM GUTTMAN

by Kara Pasquinelli



Rotem Guttman ‘12, INI faculty and CERT senior cybersecurity researcher, and his CERT co-instructor **Will Nichols** teach the CyFIR Capstone. They create fictitious cyberattack scenarios with a plethora of avenues for investigation. The students gain experience in mitigating a cyberattack as they work through problems and find ways to address the threats. ▶ *Learn more about Guttman’s immersive approach to teaching in the ‘Inside the INI’ on pg. 30.*

Guttman’s ability to work through problems step-by-step led him to an interesting hobby: blacksmithing. During the pandemic, Guttman began looking for a replica sword he wanted as a child and instead discovered he could make it: “It took me several years of practice and the use of literally millions of dollars of equipment but I’ve finally been able to produce the replica weapons I have always wanted to have hanging on my walls.”

Surprisingly, blacksmithing turns out to be not so far removed from cyber incident response. In fact, his CyFIR Capstone co-instructor Nichols is also avidly involved in blacksmithing.

“In blacksmithing, as in the CyFIR Capstone, there is no one right way to approach a problem but plenty of wrong ones. There are almost endless techniques that you can use to attack a problem. Some will require more effort, some less. And just like in CyFIR, the most important thing is to have a concrete plan of what you’re going to do before you start doing it. As soon as you pull a piece of metal out of the forge it starts to cool so the clock is ticking,” Gutman explained.

His time at the hot forge is similar to the approach he teaches to cybersecurity students. “Plenty of preparation and good planning means you’ll know each step you need to take, and you must have the right tools at hand to execute on that plan,” Guttman said. 🍷

Meet our Students

by Omasan Richardson

Wil Luca, Jinze Zhang, Sears Schulz and **Dianelys Soto Cruz** talk about highlights beyond the classroom. The student experience at the INI provides a solid foundation for personal growth and career success.

Helping Policy Keep Pace with Technology

Luca, a National Science Foundation CyberCorps Scholarship for Service (SFS) scholar, pursued specializations in Cyber Operations and Cyber Forensics. His master's project focused on proactive cybersecurity and predictive security analysis, specifically observing traffic over Tor.

Going forward, Luca plans to use his technical skills to influence policy and law: "My time at the INI has emphasized the importance of technical skills, but I have also noticed how easily those skills can either be misused or restricted if policies do not match up with the current state of technology. I hope to attend law school to help address some of these discrepancies as technology and security advance."



Wil Luca
'22, MSIS



Jinze Zhang
'23, MSIS

Giving Back, Moving Forward

Zhang was drawn to the idea of becoming president of GOINI, despite having to balance coursework and other responsibilities. During his term, he organized the GOINI Game Night, where over 100 students played games such as Poker Chip, PS5, XBOX, Switch, UNO, Chinese chess, international chess, Mahjong, Avalon and more. Zhang is also a teaching assistant and a member of the Army National Guard.

"With so much help from my friends and family here at the INI, I think the unthinkable, challenge the odds and break down barriers that I once thought were impossible to break. That's why I like to provide my energy to continue to fuel the future of the INI," Zhang said.



Dianelys Soto Cruz
'22, MSIT-IS

Closing the Gender Gap, One CTF at a Time

Soto Cruz was involved with organizations dedicated to increasing the number of women in computer science, including being co-chair of Women at INI (WINI) and a board member of the group Include Girls. "I was very lucky to work with Professor Hibshi on an independent study that focused on female participation in Capture-The-Flag (CTF) competitions, their performance and how to potentially increase their participation in these events. I got to analyze picoCTF and WiCyS CTF data to understand the participant's background, find what categories were the most challenging and design new problems that could address these findings," she said.

For Soto Cruz, who graduated in December 2021, the INI fueled her inquisitive spirit and drove her to explore new interests.

Taking Flight in Cyberspace

In December 2019, Schulz was recognized as the President's Cup Cybersecurity Competition Individual Winner, issued by the Department of Homeland Security. He placed first out of over 1,000 federal employees and was recognized by then-U.S. Vice President Mike Pence. Since starting at the INI in 2020, Schulz was GOINI president and participated in cybersecurity competitions, such as the Collegiate Penetration Testing Competition. He was also active in CMU's elite hacking team, Plaid Parliament of Pwning.

"I've enjoyed taking a diverse set of classes that are both research and applied focused, collaborating with other students on cybersecurity competitions and completing a year-long thesis," Schulz said. After graduating, he plans to attend Air Force-specific training for cybersecurity and work in either offensive or defensive operations.



Sears Schulz
'22, MSIS



From Young Entrepreneur to National Cybersecurity Advisor

Interview with Harshvardhan Chunawala

by Deana Lorenzo

A chance meeting with CMU President Farnam Jahanian.

Even before he graduated university, **Harshvardhan Chunawala** '23 was already a successful entrepreneur, company founder and CEO of Bite Group. Now, as a full-time graduate student at the INI, Chunawala is adding another title to his resume: National Cybersecurity Advisor for the Council of Information and Broadcasting (CIB) registered under Government of India.

According to Asia News, Chunawala's appointment comes at a critical time as the agency faces new and increasing cyber threats, including recent ransomware attacks in 2020 and in 2021. The CIB's Vice President told the news outlet that Chunawala had already been working with the CIB for a few years and was "perfect for the role."

"I would like to extend my thanks to INI at CMU for its strong curriculum that helped in honing my

skills for this assignment," said Chunawala, who is completing his M.S. in Information Technology-Information Security (MSIT-IS), in an email correspondence with the media. "Special thanks to faculty, staff and the Director of INI—Professor **Dena Haritos Tsamitis**—for her guidance and motivation to the students."

We asked Chunawala to tell us more about his story and how he manages to do it all.

First, congratulations on your new appointment! But we know this isn't your first major career accomplishment. Tell us how it all started.

My entrepreneurial journey started way back in 2012 when I found a vulnerability in an Indian Payment Gateway startup. It was affected by Cross-Site-Scripting and Cookie Hijacking. I reported it to the company and was offered a job there. I politely refused the job, but I worked there part-time and helped the team build a good product.

FROM YOUNG ENTREPRENEUR TO NATIONAL CYBERSECURITY ADVISOR

I soon learned to make websites (on \$25 Shared Servers) and got a few clients by cold calling and online marketing. (Hustling is the key here!). This led to the formation of my own startup, Bite Media, where I would make websites and do SEO and marketing for clients.

Soon, I started investing the profits into budding startups and partnered up with co-working spaces, providing mentorship and office spaces to new companies—this is how Bite Ventures was born. Down the line, the websites I made would face attacks, and I would have to solve them, igniting the fire of cybersecurity inside me. Months later, I started Bite Security to provide pentesting, threat detection, and incident response services. I was able to find a high severity bug in the Rivet Networks (acquired by Intel) Advanced Stream Detect feature which affected millions of MSI and Alienware users around the world. I worked with the Rivet Networks team to squash the bug, and it was deemed a gold-level bug and received bounty and a letter from the CEO himself.

A few years later, I worked at NECTAR, an organization under the Department of Science and Technology, Government of India, as a research fellow. I learned Geographic Information Systems (GIS) and advanced satellite data analysis from raw satellite data procured from the Indian Space Research Organisation (ISRO), USGS, and Planet. I later formed Bite GIS by implementing all the learnings I acquired at NECTAR. All of the Bite companies are now a part of Bite Group.

What led you to study at the INI?

I watched a video of Dr. Dena Haritos Tsamitis about imposter syndrome. I connected to it instantly, as I had it all these years and never knew about it. I chose INI as my way forward after reviewing the curriculum, and when I came to know about the bicoastal program that was offered, I knew that this was it.



Harshvardhan Chunawala with INI Director Dena Haritos Tsamitis.

I personally think that the bicoastal program and the practicum project offered by INI is one-of-a-kind. No other universities have such a thoughtful curriculum deployed at a scale. It prepares the students by making them work with the companies and giving them a smooth transition in that work environment that they will soon enter.

Soon, I was connected with the admissions team. They worked with me day and night for my documents and answered other questions I had. I fell in love with INI before even joining it. Little did I know, my heart was already in the network!

Describe what you'll be doing as National Cybersecurity Advisor.

My role as a National Cybersecurity Advisor includes developing new security policies, refining existing ones, and working with the different teams to ensure it is followed. The focus will be on preventing and mitigating cyber threats and advising on safeguarding the systems.

What are your goals moving forward? How would you like to shape the position of National Cybersecurity Advisor?

My long-term goal is to have the systems secured at CIB so that the organization doesn't face operational issues and high availability. There was a need for a Cybersecurity Advisor when the cyber-attacks started becoming a little concerning. Solving the security issues and forming new Work-From-Home and Bring-Your-Own-Device (BYOD) policies would be a focus. Not to forget completing my forthcoming semesters with a great GPA stays on the priority amongst all my short-term goals.

I believe the work in the pipeline, which has been discussed with my seniors, shall set a benchmark for the organization and would really ease the work and maintenance of systems in the future. I believe that a National Advisor has a lot of responsibility towards the organization, and I will strive to prove [the CMU motto], "My heart is in the work."

What do you think your biggest challenge will be in this role?

Challenges are everywhere. One thing that INI has taught me is to accept them as they come and never back off. Developing a vision of filtering opportunities within the challenges is essential. I foresee a few challenges like time-zone differences... another one I see is coordinating with a remote team... I plan to follow the Polyphasic Sleep Schedule to keep up with my productivity and achieve good rest.

How has your experience in the program so far influenced your career path?

My experience at INI has been amazing, can't emphasize it more! The classes, culture, care, and support from the staff and faculty are truly profound. Not to forget the flexibility of INI that extends to an individual level and supports



"I would like extend my thanks to INI at CMU for its strong curriculum that helped in honing my skills for this assignment."

—Harshvardhan Chunawala

students with their needs from the day they join. You become a part of the INI family, which will always be by your side; in your happy days and sad days—shoulder-to-shoulder. The fiery curriculum of INI prepares you well for your future life ahead.

Apart from the hard skills you learn in class, you will learn to manage your time, commitments, and work-life balance, which comes in handy in the future. The strong curriculum accompanied by super talented faculty is what I wanted for my growth, and INI gave me exactly that.

INI has had a great influence on my career ahead. I have always been an entrepreneurial person after I founded my company when I was 17—joining INI has only fostered and fueled my spirit. 🌸

Greetings, INI Alumni Community



I am Samantha Allen (MSISTM 2015), the current chair of the INI Alumni Leadership Council (ALC). These past few years have been quite interesting for many of us and we are continuing to deal with unusual and challenging circumstances across the world. During these times, your INI alumni community is here with you and for you. So, stay connected!

As I serve in my second year as the ALC chair and third as an ALC member, I'd like to take some time to reflect. Last year, I transitioned from my full-time role as a cyber security engineer and project manager to focus on

growing my nonprofit organization, The Cyber Security Intellectuals, and explore other passions. Since taking that leap in February 2021, I have remained engaged with the INI through the ALC.

Over the past year, the ALC helped make strides in further connecting students and alumni through the CMUniverse platform, participated in multiple panels and direct engagement with current students to support their professional development, and provided opportunities for alumni to connect with each other and feel supported through career transitions. I am grateful for how the ALC allows me to give back to the INI. I am ecstatic to be working with our 10 new members who joined our ALC team. Together with our continuing members, we are doing great things.

We would love to see all our alumni across the world taking advantage of upcoming opportunities to engage. In addition to joining the CMUniverse platform, which is open to all alumni looking to provide or receive mentorship within the INI community and exchange available job opportunities, keep an eye out for additional INI panels and events for alumni.

Furthermore, you can always stay connected with the INI via LinkedIn, Facebook, and the main CMU Alumni site.

I would like to thank you for being part of our alumni community and look forward to the opportunity to meet and engage with you more in the future!

Sincerely,

Samantha L. Allen '15

Alumni Leadership Council News

The INI Alumni Leadership Council was founded in 2009 to strengthen the INI alumni community and help achieve strategic goals. Throughout the year, this group of dedicated alumni representatives work to support goals through meaningful engagement with students and other alumni.

Welcome, New Members!



Patty Huang,
1990, MSIN



Sin-Kuen Hawkins,
1992, MSIN



Sree Anand Ratnasinghe,
1997, MSIN



Jatin Shah,
2006, MSIN



Andrew Spangler,
2017, MSIS



Madhur Shrimal,
2016, MSIT-SM



Ben Draffin,
2016, MSIT-IS



Preston Mesick,
2008, MSISTM



Nishant Verma, 2010,
MSIT-SM and 2018 Tepper

Continuing Members, not pictured:

Samantha Allen,
2015, MSIS, *ALC Chair*

Victor Dibia,
2011, MSIN in Athens

Xinfeng Le,
2014, MSIT-IS

Tyelisa Shields,
2010 MSIT-IS

Archie Agrawal,
2015, MSIT-SM

Yen-Ming Chen,
1999, MSIN

Devika Yeragudipati,
2012, MSISTM

Nishant Tayade,
INI Student Representative



Anusheh Zohair Mustafeez,
INI Student Representative

2021-2022 Highlights

- **Launched CMUniverse**, an online alumni mentorship and job platform that makes it easy to connect and share your insights: cmuniverse.peoplegrove.com.
- **Held an interactive alumni event** discussing how leaders have non-linear careers, where attendees began to ideate building a personal board of directors to foster friendships and goal-setting.
- **Held alumni panels** in the Academic and Professional Development course, assisting with topics such as informal interviewing techniques and career options.
- **Attended conference meet-ups**, both in-person or remote. The INI will be attending Grace Hopper, The Diana Initiative, RSA and more!
- **Provided insights** for Women@INI (WINI) at an event about the alumni journey.
- **Helped students** along their internships through the alumni and student intern program.
- **Celebrated** the first-ever INI alumni virtual reunion!

Take your INI Alumni impact to the next level

1. Bring the INI into Your Workplace

Practicum sponsorship is a great way to connect with INI students and apply their talents to projects in your workplace. We are always looking for internship, full-time and practicum project sponsorship opportunities.

2. Reconnect with INI Alumni Online

Your preferred social media channel is a great way to stay connected with the INI:

- Facebook Group: Search “**INI Alumni**” and request to join!
- LinkedIn **Carnegie Mellon Information Networking Group** at www.linkedin.com/groups/1167707/.

3. Be a Mentor

Participate in CMUniverse. The INI alumni network is actively discussing questions about careers and professional development and offering advice. Join them at cmuniverse.peoplegrove.com.



Contact **Sari Smith** if you would like to discuss ways to get involved in the INI alumni community. This includes ideas for alumni events and engagement, plus connecting to INI students as a guest speaker or alumni panelist. Send an email to: ini-alumni@andrew.cmu.edu

Class Notes

You Always Have a Home at the INI

Alumni reconnect and share news.

With 2,400 alumni spread across the globe, the INI encourages each of you to send us a message about the changes happening in your lives. Whether you have a new job or are celebrating your work anniversary, we want to hear from you! Tell us about your achievements and personal milestones.

Wedding Bliss

By Ann Lyon Ritchie with Sari Smith



Archana Iyer '16 and **Keane Lucas '16** have waited long enough. The couple, who first met at the INI in the fall of 2014, are tying the knot, having persevered through a long-distance relationship, two wedding date postponements, and the global pandemic.

They met on the INI boat cruise at orientation and became friends during their first semester.

"We first started hanging out after she sat next to me in networking class 14-740. It's kind of appropriate: *networking class*," Keane said.

In their second semester, the couple became serious. Archana went to Silicon Valley in the

third semester as part of her Master of Science in Information Technology-Mobility. Keane pursued the Master of Science in Information Security. Together they pushed each other to achieve their goals.

A favorite memory is capturing The Fence over the weekend of the INI 25th Anniversary Celebration in May 2015. They were among a group of students who painted "Configure the Future" across the rails. They had to capture The Fence first, despite the rain and having a ton of homework, so the group took turns guarding it all night while working on homework in the tent.

CLASS NOTES



After graduating, Archana took a job with Microsoft and Keane advanced his research interests with the U.S. Air Force. Altogether they dated for five years while building their careers, as well as interests. Archana started a comedy podcast, *Let's Chaat!*, from the perspective of Indian immigrants coming to the U.S. Keane is pursuing his Ph.D. at CMU, and they are happy to be back in Pittsburgh again.

Keane planned a surprise proposal in August 2019. He knew Archana planned to have headshots taken by a photographer in Seattle, where she was working at the time. He flew from Baltimore, showed up unexpectedly to the photo shoot, and got down on one knee. His efforts seemed to be rewarded when she said "yes"—until they set a date in July 2020, and the pandemic brought everything to a standstill in the spring.

"We pushed it to 2021, but COVID was still happening," Archana said.

Finally, the world began to open up again. The couple held a ceremony with Archana's family in Bombay, India, that they were able to celebrate in December 2021. They will also have a wedding ceremony this summer in Alaska.

Although they come from different parts of the world, the two say they share the same

priorities in life: family and kindness. Keane says Archana helps him to be more outgoing. Archana says he has helped her to become more focused and disciplined.

"He just doesn't give up," she said admiringly.

"What that really means is that I'm stubborn," he joked.

After much persistence, the couple will have their U.S. wedding this July in Keane's hometown of Wasilla, Alaska. The INI wishes them all the happiness the world has to offer. 🌸



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news.

A New Arrival

Luza Jaramillo '12 and Juan Trujillo '12 welcomed their daughter, Clara, born July 7, 2021.



New Faculty Q&A

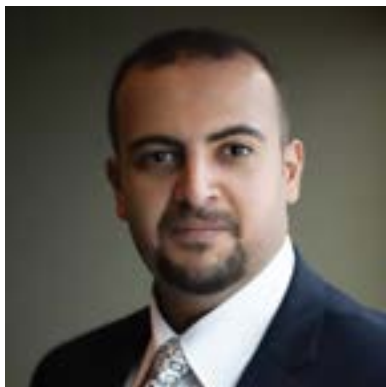
The INI added three new faculty members this year.
Get to know them!



Dr. Joanne Peca, Associate Professor of the Practice and Associate Director, based in Pittsburgh. Peca teaches courses in the areas of information security, risk management and policy, as well as supports student learning, professional development and community partnerships.



Dr. Sujata Telang, Associate Teaching Professor, based in Pittsburgh. She teaches courses in software development and engineering, ethics and other related areas. Telang also leads the practicum course and overall experience, cultivating sponsor relations and supervising projects.



Dr. Mohamed Farag, Assistant Teaching Professor, based in Pittsburgh. Farag teaches courses in the areas of data science, machine learning, cloud computing and systems. He also serves as faculty liaison for INI Admissions, conducting predictive modeling and analysis of admissions data and other related admissions activities.

Q: Hometown and alma mater?

JP: I hail from Williamsburg, Pennsylvania. I'm an alum of the Yale School of Management, Northeastern University, Drexel University, Rider University and Penn State University. I've also completed professional programs at Stanford University and the Thayer School of Engineering at Dartmouth.

ST: Originally from India, Pittsburgh has been my home since 1994 and that of my alma mater, Carnegie Mellon. That said, I have studied in India, the U.S. and the U.K.

MF: Shubin Al-Kawm, Egypt. George Washington University, Maharishi International University and Minufiya University in Egypt.

Q: What drew you to the INI?

JP: The interdisciplinary nature of the INI aligns with both my academic and professional backgrounds; it's not often you find an intensely technical program that also recognizes and appreciates the connection to other disciplines.

ST: I see CMU's philosophy and strengths amplified by INI programs with their interdisciplinary focus—one that bridges both Pittsburgh and Silicon Valley campuses—and through contributing to unique academic experiences for their students.

MF: INI's culture and its support for diversity.

Q: Who have been your biggest inspirations?

JP: I'm a first-generation college student and my parents are my biggest inspiration. They're brilliant people who didn't have an opportunity to attend college, so they did everything possible to make sure I could.

ST: Frank Lloyd Wright, with his philosophy of organic design and more, majorly influences how I envision my role as an educator looking to apply that philosophy to teaching and learning. Donald Schon, with his philosophy of reflection-in-action, has been a tremendous influence through my transition from industry to academia.

MF: My parents! Coming from a middle-class family, my father was a role model professor who puts student education quality above almost everything else. On the other hand, my mother was a true warrior who balanced her work and her devotion to the family. I can't be grateful enough for all they did.

Q: Best piece of advice you have for your students?

JP: Like all things in life, you will get out of this program what you put into it.

ST: It is key to keep an open mind to learning, critique and feedback.

MF: Work smarter but not necessarily harder. 🐶

“Our faculty are the backbone of the exceptional education we offer at the INI.”

- Dena Haritos Tsamitis



Inside the INI

New AI Degree, New Course, Innovative Faculty

By Ann Lyon Ritchie and Daniel Tkacik

Degree in Artificial Intelligence Engineering – Information Security

The leadership of CMU's College of Engineering in research and education necessitates curricula that evolves and addresses ever-changing needs in technology, business and society. Some of the newest college-wide initiatives embrace rapid growth in technology. In conjunction with six other departments, the INI is offering a new program.

As part of a college-wide initiative focusing on artificial intelligence, the INI will soft-launch a new **Master of Science in Artificial Intelligence Engineering - Information Security (MSAIE-IS)** program this fall. MSAIE-IS students will gain an ability to demonstrate knowledge of AI methods, systems, tool chains and cross-cutting issues, including security, privacy and other ethical, societal and policy challenges. Students will apply AI concepts to the design and implementation of information security systems, including networks, software and services.

Teaching Future Leaders

The INI encourages students to complement their technical knowledge with skills essential for professional and personal success. To that end, the INI recently launched a new core requirement known as **Academic and Professional Development**, or APD for short. Through this two-part course, APD 1 and 2, students practice leading teams such as analyzing group dynamics in decision-making and evaluating their communication styles. **Cynthia Kuo**, INI Associate Professor of the Practice, teaches the course and sees how students benefit, even before graduation.

"Some students apply the time management techniques to manage their workload. Other students use the storytelling techniques to improve their answers for behavioral interviews," Kuo said.



Cyber Forensics Course: An Immersive Experience

Rotem Guttman '12 received the university's Andy Award for "innovative and creative contributions." An INI alumnus, Guttman has been teaching the **Cyber Forensics and Incident Response Capstone course** since 2015, mostly in a traditional lecture-based style. Once remote learning became the new normal, Guttman swiftly adapted.

The idea: immerse the students into a highly realistic scenario where they must, over the course of a single semester, conduct a formal forensic investigation on a fictional cyber incident, build a case, and present it to a panel of judges.

"By the end of the course, I want my students to be able to say that they are experienced in building a cyber incident case," says Guttman, a researcher at the Software Engineering Institute and faculty at the INI. "If there's a cyber incident on their first day of work, I don't want the deer-in-headlights reaction. I want them to be like, 'Yeah, I've got this.'" 🍷

A version of "Cyber Forensics Course" was originally published by Carnegie Mellon University's CyLab.

#INIGRAM



Your Gift Matters

Make a gift to support an INI student today.

You may designate your donation to a specific area, described below, as a one-time or recurring gift:

- Innocent Habiyaemye Memorial Award
- INI Strategic Fund
- Roseanne K. Silva Endowed Professional Development Fund
- Joyce Brocaglia - EWF Endowed Fellowship
- INI Graduate Student Fellowship Fund



giving.cmu.edu/ini



Roseanne Silva
1991 Alumnus

*“For me, it really is about **the next generation** and enabling someone to realize their potential. This is a very prestigious organization and to be here is not cheap but there is **so much talent** and I am really awed by that.*

*I encourage you to start early. **You can build** as you become more established in your career. Keep adding those zeros.”*

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