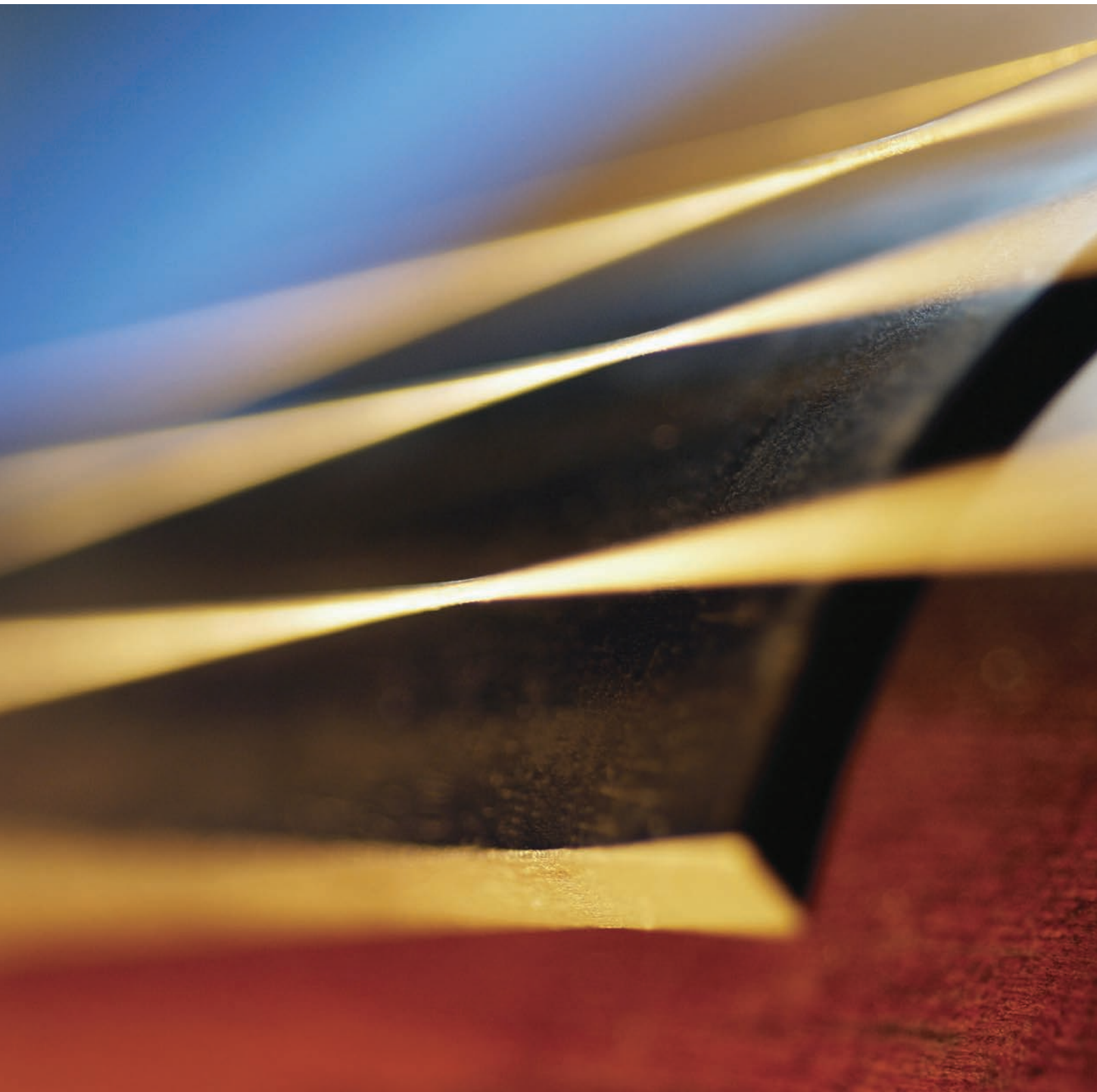


*HOPE COLLEGE*

# S P E R A



SPOTLIGHT ON FACULTY RESEARCH AND SCHOLARLY WORK

| 2020 |

## ON FOUR CONTINENTS, HELPING AGENCIES ENCOURAGE FOSTER CARE

DEB STURTEVANT, PH.D. | PROFESSOR OF SOCIAL WORK

Dr. Deb Sturtevant's "on the side" takes her quite a distance. Guatemala. China. Romania. Zambia. Since the 1990s, she's worked on projects with the global arm of Bethany Christian Services. In a six-year effort in Zambia that wrapped up in 2015, she and colleagues evaluated a community-based family support program and networked with a local agency and church to improve children's well-being and support development of community resources to keep families intact.

“When I went to Zambia the first time in 2009, the sub-Saharan HIV rate was huge; we were looking at life, death, survival. The Christian Alliance for Children in Zambia operated a crisis care clinic for kids who were abandoned in ditches, bus stations, etc. They were brought to the clinic by police or local people who found them. We worked with the agency to evaluate its existing program, to propose improvements and to encourage them to develop a local foster care program. We realized extended families — aunties, grandparents — or foster parents would keep children in families and reduce the number of children in orphanages.

In countries where people in dire poverty have been in survival mode, it's interesting to be in conversations with social workers and church members and encourage them to think differently about what it means to be a family. Orphan care might keep kids alive, but it doesn't provide all they need to become productive members of society nearly as well as having a family does. Every child deserves a family.”





Hope College's motto, **SPERA IN DEO**, means "Hope in God."

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February 2020

Dear Friends,

Welcome to *Spera* 2020!

As an alumnus of Hope College, it is a particular pleasure to introduce this year's issue of *Spera*. Now in its third year, this publication shares stories of faculty research, scholarship and creative performance at Hope.

Like so many graduates of Hope College, I experienced transformational mentorship from my professors — across all disciplines. In their everyday work, they guided me through rigorous academics, connected me to an amazing internship, supported me in my journey toward graduate school and prepared me for a career that ultimately would lead me back to this beloved campus. Now, as president of Hope College, I find special joy in the opportunity to work alongside the very people who always brought out the best in me.

In 2019, *U.S. News & World Report* ranked Hope #48 among all liberal arts colleges in the country for “Best Undergraduate Teaching” — a reflection of our “unusually strong commitment to teaching.” Our faculty are not only exceptional teachers, though; they are excellent scholars, too. Also in 2019, Hope continued its streak of placing on the *U.S. News & World Report* list for “Outstanding Undergraduate Research / Creative Project Opportunities.” Hope earned a ranking of #23, tying with Cornell and keeping company with schools like Yale, Stanford, MIT, Princeton and Northwestern.

How is it that Hope College receives this kind of recognition year after year? When you read this issue of *Spera*, you'll understand. You'll discern the great passion that our faculty have for research — a passion that they share with their students. It's a passion that stays with Hope alumni after graduation. Indeed, in my first year as president, I have met many young alumni now in graduate school, eager to share how they stand apart from their peers, thanks to the “graduate-level undergraduate experience” they received from their professors at Hope.

Together, Hope faculty and students pursue truth, knowledge and beauty in all its forms, and in doing so, take part in a pursuit of God. They bring life to Hope's motto, “*Spera in Deo*” — the inspiration for the title of this publication.

I hope you enjoy reading the stories in *Spera* 2020! And, I invite you to read more stories about faculty research, scholarship and creative work throughout the year at [blogs.hope.edu/stories-of-hope](https://blogs.hope.edu/stories-of-hope).

Sincerely,

A handwritten signature in black ink that reads "Matt A. Scogin". The signature is fluid and cursive.

Matthew A. Scogin  
*President*



## DEANS' COUNCIL 2019-2020

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## INTERDISCIPLINARY EXPLORATION OF GLOBAL ISSUES

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An innovative Hope College initiative enabled 50 faculty members to travel internationally in teams over the past 18 months to interact with scholars in other nations about complex global problems.

“The impact on faculty is just tremendous,” says Dr. Deirdre Johnston, interim associate dean for global education, who co-directed the Hope Portals to the World program with Dr. Annie Dandavati, professor of political science. “I believe that absolutely every academic discipline has a need to engage with how globalization is changing what we have taught in that discipline.”

The Portal to the World twist has been for faculty from a mix of disciplines to go abroad together following a semester of reading about and discussing their team’s focus and the history, politics and economy of the nation they would visit, sharing perspectives informed by their academic fields.

Many returned to Michigan with strengthened networks for collaborative research and globally connected courses.

For instance, Dr. Phillip Rivera has a grant proposal underway with a fellow biologist in Ecuador. Psychologist Dr. Alyssa Cheadle plans to trade data with a sociologist and an economist in India to broaden her research sample for investigation of religiousness and well-being. Mathematician Dr. Airat Betmetjev gained new insight from researchers in China, which he’s leveraging for computationally complex tasks in his work on statistical projects.

Hope Portal to the World study travel was underwritten by a grant from the Great Lakes Colleges Association Global Crossroads program, which is funded by the Andrew W. Mellon Foundation. The initiative concludes this semester with the final team’s participation in a Paris conference on the Armenian genocide. All told, 11 teams will have visited 11 nations on four continents to explore issues ranging from scientific research to human embodiment through sport and art.

*Learn more at [spera.hope.edu/portal-program](https://spera.hope.edu/portal-program)*

# Streamlining Robotic Coding

MIGUEL ABRAHANTES, PH.D. | PROFESSOR OF ENGINEERING



In a Hope College engineering laboratory, a roomful of Roombas® — or more accurately, Kobuki mobile robots (shaped like the popular Roomba vacuums, but with no cleaning power) — are carrying on earthbound research that grew out of knowledge a professor acquired while working on other robots intended for space exploration.

And if the work succeeds, Dr. Miguel Abrahantes will have landed upon, among other discoveries, a strategy to significantly reduce the amount of computer power and processing needed to operate multiple robots simultaneously.

The “smart navigation systems” in 21st-century cars require massive amounts of data to operate, Abrahantes notes. For coordination of multiple robots’ activity,

he hopes to streamline the process so that the data handling becomes more efficient and reliable.

His current exploration was launched by NASA. For 10 years beginning in 2006, Abrahantes’ research included projects with the federal agency’s scientists. He spent two summers at NASA’s Goddard Space Flight Center in Maryland, collaborating on a fellowship-funded project with a team of professors from across the country who specialize in various areas of robotics. “My focus was controlled robotics,” Abrahantes says. “That’s my Ph.D. area, control systems.”

Having organized a student robotics group at Hope in 2004 shortly after his arrival on campus, Abrahantes often brought his prized pupils along for the experience.



When funding expired for that program and NASA turned its attention elsewhere, he applied the knowledge he had absorbed to his current endeavor.

“What NASA wanted to do was create a robot that, instead of having wheels, would just tumble along,” he explains. “You could send it to the surface of places like Mars or the moon and the wheels would not be a problem getting stuck on the floor of the planet while exploring.”

“My part was just the programming side of it, but after I came back I built one with students. This idea has many pieces that are similar.”

“This idea” involves a fleet of autonomous robots that could be programmed to work together or independently, depending upon the circumstances. “You’ll have robots that will be navigating in a coordinated way,” Abrahantes says, “and need to share information and do different tasks.” In summer 2019 and during his sabbatical in the fall that followed, he equipped the robots for test runs with various numbers and combinations of sensors. By assessing the responsiveness and accuracy of these different assortments, he hopes to find the “less-is-more” sweet spot that delivers strong results with the minimum number of sensors, and hence to work in the coding to deliver the minimal amount of processing needed to coordinate the work of multiple units.

Unlike robots that are tasked with, say, dismantling bombs, these units would not necessarily have a human operator controlling their every move. They would be programmed once, and then set out to perform specific functions independently or as a team.

“You can imagine a group of robots that would be cooperating in disaster relief, in urban areas, rescues — also military applications,” Abrahantes suggests. “In areas where it’s hard to communicate. But they can be responding by themselves at different points.”

His goal, he says, is “to start implementing this hardware and software, putting them together and adding sensors and the communication capabilities. Then we’ll start studying the algorithms — how they communicate and navigate autonomously.”

Hope students have been assisting him with the implementation from the beginning. “The students have actually taken to this project more than I have,” he beams.

In the summer of 2019, computer science major Brandon Maurice ’20 served as Abrahantes’ assistant. “It’s really piquing my interest in wanting to go into the engineering field in terms of programming,” Maurice says. And that interest may have been further sweetened by the project’s raspberry pies.


Just kidding. Not that kind. Raspberry Pi’s.

(Raspberry Pi is the model name of a bare-bones processing unit without keyboard or screen, manufactured by Bluetooth SIG, Inc.)

As the project got underway, the Kobuki robots — each one named by a student for one of the Teenage Mutant Ninja Turtles — were carrying, like turtle shells, laptop computers connected by a secure network to a desktop unit. Abrahantes rigged the laptop computers to the robots so he and his students could control the robots’ movements by keystrokes.

Later, Maurice replaced the laptops with Raspberry Pi units. “With Raspberry Pi’s the possibilities are endless in terms of what you can do with technology,” he says. “It’s awesome.”

Barring complications, Abrahantes hopes to take the computer-topped robots, rigged also with cameras that will enable them to maneuver around objects, out of the lab and into the field early this year.

One of his goals is to minimize the sensing capabilities in the communications. “How simple can you have the system that can do the tasks?” he asks rhetorically. “As you add capabilities, it becomes more and more complicated, but one approach is trying to reduce the amount of data required. Instead of having 10 sensors, see if it can be done with two or three.” 

— *By Jim McFarlin | Photo, Steven Herppich*

*See the robots in action at*  
**[spera.hope.edu/abrahantes-robots](https://spera.hope.edu/abrahantes-robots)**

# A Gothic Church, a Holy Tear

ANNE HEATH, PH.D. | ASSOCIATE PROFESSOR OF ART HISTORY

Jesus wept. And for seven centuries, a Benedictine abbey church in France claimed to have preserved the tear he shed.

Dr. Anne Heath doesn't challenge the belief that the Abbey of La Trinité (the Holy Trinity) in Vendôme once maintained and venerated a tear that Jesus cried at the tomb of Lazarus, as described in John 11. But she is

challenging the centuries-old notion of how and where that relic was enshrined within the Gothic structure.

Her research requires searching through page upon page of French and Latin documents — some dating back to the 13th century and earlier — and looking at countless examples of medieval art in France and in collections around the world. “So much has been lost





over the centuries,” Heath says. “You have to be willing to sift through an enormous amount of incomplete, imperfect evidence if you want to understand the visual culture of the Middle Ages. You’ve got to take whatever evidence survives and think, *What questions can I ask with this?*”

If trying to pinpoint the placement of a relic in an abbey doesn’t fit your notion of “art history,” consider Heath’s perspective. She is equally interested in medieval architecture and art objects, and in how people related to them long ago.

“It’s much more interesting when you can imagine a viewer response to medieval objects in the place they were originally intended for,” she says. “I tell students in my Introduction to Art History class, ‘I’m an art historian, but I’m really interested in people.’ I want to know what they experienced in a space, looking at a work of art. How did people engage with it? What did it mean to them?”

“Most medieval spaces are gone or have been significantly altered over time,” she laments. “Through detective work — like going to a place and trying to reconstruct its medieval manifestation from whatever remains — I can begin to understand what it might have been like for communities and individuals to encounter works of art. I can’t really recreate that, of course. But I can take ideas or social relationships and think about how they played out in a space. That’s what got me into medieval art history.”

The Abbey of La Trinité was consecrated in 1040 and rebuilt between the 13th and 16th centuries. Today the French consider it a national historical monument. The Holy Tear, however, was less fortunate. “It lasted until 1803,” Heath says. “Then it was lost — likely thrown away because its authenticity was no longer believed.”

According to legend, the Holy Tear — a drop of water encased in a rock crystal ball — was transported from the Holy Land by the monastery’s founders, Count Geoffrey Martel and Agnes of Burgundy. In antiquity, rock crystal was more precious than gemstones. “It is hard and as clear as glass; it’s incorruptible. It was the perfect material to be associated with Christ,” Heath explains. “Pilgrims would come and press the Holy Tear on their eyes. It was well known for curing blindness — which is a physical ailment, but in the Middle Ages, people believed it could have been caused by a soul lacking faith.”

She reasons that since pilgrims would have traveled en masse to be blessed by the Holy Tear, there must have been a place at the abbey for them to encounter this relic of Christ’s body. The shrine, now lost, was an artwork in its own right that complemented the presentation of the Holy Tear with imagery relating to the Holy Tear’s history and meaning. Historians have documented where the shrine was kept in the 1500s, but Heath believes it resided elsewhere in La Trinité’s earlier history. “I think that when it was first installed in the 13th century, it was placed near a spring that was part of the abbey’s origin story. The monks wanted to connect this prestigious Christ-relic with their local place.”

Hope art major Emily Lindbloom ’20 accompanied Heath to France in mid-2019 to photograph the abbey and make reconstructive drawings based on Heath’s archival research and tracking of archaeological traces in La Trinité and comparable shrines in other French abbeys. “Being together in Vendôme was so helpful because I could show Emily exactly where I thought the shrine was, and she could see the space and the evidence firsthand that I’d been telling her about over the past two years,” Heath says.

She is publishing two articles about this project and will fold them into a book she’s writing about the abbey. Her ongoing research in France is enriched by her participation in a “monastic roundtable” of scholars at Reid Hall in Paris, one of Columbia University’s global engagement centers. “We’re a group of medievalists from Europe and America,” Heath says, “musicologists, historians, art historians, all sharing our research at different stages, which has been really helpful.”

Gothic structures like La Trinité, Heath says, “are part of a grand continuum. They are born of an architectural language that captures the imagination so that we still care very deeply about them. The 2019 fire at Notre-Dame in Paris is an example of this. There’s something special about Gothic structures — even Dimnent Chapel. It’s revival Gothic architecture, but I tell my students the architect, William K. Johnston, also sat in an art history class long ago. Why do you think he chose Gothic architecture for Hope’s chapel? Because it has meaning as being spiritual, ethereal and eternal. It radiates.” 🍁 — *By Jim McFarlin* |

*Photos, Emily Lindbloom ’20 and Dr. Anne Heath*

See more of the abbey church at  
[spera.hope.edu/heath-abbey-church](https://spera.hope.edu/heath-abbey-church)



# Decoding Mitochondrial Transcription

KRISTIN DITTENHAFFER-REED, PH.D. | ASSISTANT PROFESSOR OF CHEMISTRY



Well beyond the reach of unaided sight lies the genesis of energy we use every day to lift a cup of coffee, climb a mountain or twitch an eyelid. That is, we do when our cells are functioning properly. Many cases in which they're not can be tied back to the specialized compartments in our cells that produce our energy: mitochondria.

"Name a disease," Dr. Kristin Dittenhafer-Reed declares, "and I'll tell you why the mitochondria is important for that disease." That's an overstatement, she immediately confesses — but not by much. Metabolism is fundamental to cellular function, and she calls mitochondria "the central metabolic hubs in our cells."

These hubs accomplish their work via transcription and translation — reading the contents of DNA and turning them into physical products (proteins), machines the cell uses for innumerable functions, including processing nutrients into usable energy. Both the nucleus (the "brain" of the cell) and mitochondria (colloquially known as the "powerhouse" of the cell) contain, transcribe and translate DNA. Dittenhafer-Reed is investigating one protein involved in mitochondrial DNA's transcription phase, an "unzipper" that separates DNA's strands before the sequence is copied. She hopes to identify how this protein is regulated to modulate energy production.

"Transcription goes from blueprint to a piece of the blueprint," Dittenhafer-Reed explains — like zooming in on the plan for a doorway from that for the entire house. "Translation goes from the blueprint to building the actual thing." Creating another layer of complexity are chemical tags added to a protein after it is made. Like adding a mail slot to a door, these post-translational modifications can alter protein function.

"It's well-established that these modifications play a major role in regulating transcription in the nucleus," Dittenhafer-Reed says. "We want to know whether this mechanism also exists in the mitochondria. The goal of my lab is to shed light on unexplored biochemical processes at work in the mitochondria."

Her research draws on an arsenal of grants and previous findings. Dittenhafer-Reed is a Towsley Scholar, and through this Hope College program she's receiving research funds and dedicated research time over four years. Her project is also midway through a three-year, \$207,900 National Science Foundation grant. At the 2019 American Society for Biochemistry and Molecular Biology annual meeting, she and student research assistants presented their findings to date — an experience that united Dittenhafer-Reed's loves of teaching and researching as a Christian scientist.

"By exploring the intricate details of creation, you become more in awe of God," Dittenhafer-Reed reflects. "To think that God created something so complex is amazing to me." 🍷 — *By Natasha Strydhorst | Photo, Steven Herppich*

# Software Development as Community Outreach

MICHAEL JIPPING, PH.D. | PROFESSOR OF COMPUTER SCIENCE

If you're asked to imagine a "life-changing" app — go ahead, try it — do you flash back several summers to Pokémon Go, the sensation that pulled thousands outdoors to re-experience the world around them?

Dr. Mike Jipping is proving that an app need not be flashy or viral to profoundly, positively alter lives.

He's working through a steady stream of projects to improve the lives of people with cognitive impairments — by coding apps. For each app, his goal is to make the life of at least one person at least a little easier.

Finding students who share this vision has been easy. Participants in the Hope Software Institute (HSI), the Department of Computer Science's student-faculty collaborative research program, have teamed with him on several coding projects. "They want to do software development that affects peoples' lives and makes folks more independent," Jipping says. "They don't want to write an app to play a game on your phone, but to help somebody live a better life."

In recent years, Jipping and students have created a number of products for people who needed assistance an app could provide. To help a part-time Hope student use Holland's local bus system, which a spatial processing disorder made hard for him, they coded MAXTracks in the summer of 2014. Articulus, a Chrome extension that simplifies the reading level of web pages, was developed for Black River High School students stumped by advanced language on websites they consulted for schoolwork. In 2016, HSI students developed Bilancio for iOS, which helps people with cognitive impairments budget their money effectively. (They updated it for Android in 2018.) Jipping provides the apps to users at no charge.

In 2019, he began developing an app to help people initiate or join a conversation with an acquaintance. It will remind them of details from prior conversations. "This is for folks with impairments, but it's also for me," Jipping says, setting the scene. "You show up at a party, or you meet someone on the sidewalk, and you start a conversation with them — and you're trying like crazy to remember who they are." This app, still in development, would identify the acquaintance's voice, locate it in the phone's database and pull up his or her name and relevant details. The final hurdle in the project will be to code the app to separate and identify the voices of multiple speakers in a conversation.

"I think that if I can use technology to make peoples' lives better, that's what God wants me to do with my ability," Jipping asserts. "This is not just writing something to prove that it can be done; it's writing something to make someone live better, to overcome obstacles and barriers. Technology can do that — and do it well." 🍷

— *By Natasha Strydhorst | Photo, Steven Herppich*



# Translating Classical Latin, Decoding Gender and Power

STEPHEN MAIULLO, PH.D. | ASSOCIATE PROFESSOR OF CLASSICS

Converting one language into another isn't just a utilitarian task; a good translator conveys the voice and linguistic nuances of the person whose words are being translated. But what if you are a 21st-century man translating the writings of a 17th-century woman? What challenges does a modern man encounter when decoding the thoughts and words of an early modern woman who had to navigate the gendered power structures of her day?

Dr. Stephen Mauillo knows the feeling. And now, he knows those of Anna Maria van Schurman, too.

For an upcoming book with Hope Senior Research Professor Dr. Anne Larsen, in 2019 Maiullo completed the translation into English of more than 100 handwritten letters and poems by van Schurman, a Dutch intellectual who lived from 1607 to 1678. Does her name ring a bell? Probably not. Yet, she is precisely the kind of woman you wish you had learned more about in history class — worthy not just of a mention, but a prominent role in a textbook chapter on “Accomplished Women of the 1600s.” At a time when women were expected to be aesthetically seen and not intellectually heard, her intelligence and determination could not be contained. In the Netherlands in 1636, she became the first European woman to receive a college education.

Chronicling van Schurman's life is a long-term project for Larsen, who retired from teaching French at Hope College in 2016, the same year the publisher Routledge issued her biography of van Schurman, *The Star of Utrecht: The Educational Vision and Reception of a Savante*. In this second book, Larsen pairs her understanding of 17th-century European cultures and vernacular languages with Maiullo's fluency in classical Latin to decipher oblique messages that van Schurman wove through her writing.

A speaker of 14 languages, an artist, a poet and a philosopher, van Schurman wanted to extend her education — and knew she needed men's help to do so. Latin was the scholarly language then, the *lingua franca*, and she wrote immaculately in that ancient

tongue — a rarity for a woman of that day. She employed it to correspond with two prominent Dutch men, theologian and educator André Rivet and poet and diplomat Constantijn Huygens. Van Schurman's thesis, in Latin, to them: that women should be allowed to receive a formal education. Would they help?

“When she writes to Rivet, her Latin is so hard to read because she is twisting herself in knots in order to play a modesty game,” explains Mauillo. “Her Latin is always crisp, and it's always in the classical style of Seneca or Cicero. She has to prove that she has the education to play with the boys. Still, she knows that what she is doing is transgressive.”

Aware that she must keep asking men for their permission to be intellectual, van Schurman plays their mind game to prove that she is.

“She does this by quoting, in Latin, the Roman poet Catullus,” describes Mauillo. “In her second letter to Rivet, Anna Maria writes, ‘I'm working on this little book.’ *Little book* is a phrase Catullus uses in his first poem to describe his poetry. Then she says, ‘It's nothing but trifles,’ another phrase that Catullus uses in his dedication to describe his poetry. And finally, she says, ‘I'm writing in French, a charming and elegant language’ — a third phrase that Catullus uses. So, she's coding her knowledge of the classics for him.”

While Maiullo's knowledge of classical Latin drove his translation work, he says that empathy and imagination also were important tools for decoding subtexts. He and Larsen have far more letters at their disposal that were written by van Schurman than by Rivet or Huygens, and they have no way of knowing what passed between van Schurman and each of the men when they met in person. How might missing letters and conversations lost to history have influenced and undergirded their epistolary “chats”?

“It's like when you are in a restaurant and hear only one side of a phone conversation,” says Maiullo. “You don't really know who's on the other end, or what's being



said, or what the words even mean. They're all familiar words, but people use them with one another in ways that are not in dictionaries sometimes."

As far as Mauillo and Larsen can tell, van Schurman could not convince Rivet of her thesis. As for Huygens, he seems to have pursued an unrequited romantic relationship with this woman of wealthy means. "In fact, Huygens wrote about Anna Maria in a letter to another correspondent that is rife for a #MeToo complaint," Maiullo says.

Which made Mauillo feel sympathetic and apologetic, not just once but often.

"Here I am, a male scholar educated in the classical tradition, not unlike all of these men whose world she was trying to break into. But in the 21st century," he reflects, "this actually might be the right thing to do — to have male scholars study women in history. I've been living in this woman's brain for the last seven years, trying to understand what it might be like to live on the margins. I can't say that I know exactly what it's like to be this woman in her circumstances, but her world has opened up to me."

Mauillo plans to continue his scholarship on van Schurman's writing. He and Larsen will soon start to translate her *Opuscula* — a collection of letters and poems — from Latin and French to English for the first time. 🏹

— *By Eva Dean Folkert* |

*Photo, Steven Herppich*

View one of van Schurman's letters at [spera.hope.edu/maiullo-letter](https://spera.hope.edu/maiullo-letter)





## STRIVING FOR BALANCE IN ZEELAND, MICHIGAN

MAUREEN DUNN, PH.D. | PROFESSOR OF KINESIOLOGY

KIRK BRUMELS, PH.D. | PROFESSOR OF KINESIOLOGY

When an elderly person falls, a cascade of medical problems may follow. So when a cluster of falls occurred in 2019 in the assisted living section of a West Michigan senior community, staff asked Hope's Department of Kinesiology for advice. Dr. Maureen Dunn and Dr. Kirk Brumels teamed with physical therapist Dr. David Krombeen '12 to design a balance intervention program. In a trial run this winter, some residents are sticking with the facility's existing fitness classes while another group does balance-building exercises guided on-site by a Hope kinesiology major. Brumels and Dunn will assess the outcomes to inform program design going forward.

**“Dr. Dunn:** Our goal is to include tasks that have been shown previously to improve balance. One thing that improves balance is to stand. Moving your eyes and head can also improve balance, and that can be done seated. Exercise of this sort may prove beneficial to residents of the senior community who are living independently, too, as a preventive program.

**Dr. Brumels:** To maintain balance, we not only require physical strength, but we must be able to effectively process sensory, visual, auditory and positional feedback. If someone's walking and a sound or a sight startles them or they quickly change positions, how are they able to maintain balance? The program challenges participants in all of those areas, and then we will put them together into activities of daily living and functional movements and hopefully improve balance. Good balance is not something you can get too much of.”







# How Sanctification Works

ANGELA CARPENTER, PH.D. | ASSISTANT PROFESSOR OF RELIGION

“From the moment of birth the human person is becoming.”

This first line of Dr. Angela Carpenter’s *Responsive Becoming: Moral Formation in Theological, Evolutionary, and Developmental Perspective* sets up an interdisciplinary exploration of how we go about “becoming.”

One essential element is moral formation, and it’s this aspect of the human experience that Carpenter focuses on in her 2019 book published by T&T Clark as part of its Enquiries in Theological Ethics series.

“In terms of theological discourse and in Christian ethics, most people who talk about moral formation are talking about virtue ethics,” Carpenter says. Fewer scholars are talking about sanctification, which Carpenter admits is “an old-fashioned word” for a doctrine which teaches, from a Reformed perspective, that “our moral transformation — our transformation into the image of Christ — is a work of God’s grace.”

Carpenter suspects that scholarly and Christian discomfort with the doctrine of sanctification stems from the apparent mysteriousness of the concept, and a misunderstanding of the Holy Spirit as something similar to “a fairy godmother waving a wand.” From this errant (but common) perspective, sanctification “takes place apart from our sense of our lives and who we are in our communities.”

If this conception of sanctification as something that happens *to* us isn’t entirely correct, though, neither is virtue ethics, which attributes moral transformation to a person’s own agency, through a process of habituation. As Carpenter expresses it, “I might not feel like doing the right thing right now, but if I can just force myself to do the right thing over and over and over again, I’m going to instill a new habit. I’m going to become a new person.”

In short, there are two perspectives about how moral formation actually works: that it’s entirely from the outside, a gift of grace divorced from human effort; or that it springs entirely from within, dependent on human will to form new habits and muscle one’s way into virtuous maturity.

Carpenter is quick to clarify that she doesn’t see her project as anti-virtue. “There are aspects of virtue that I do find really helpful in thinking about Christian ethics and transformation,” she says. Rather, she sees it as “a sort of shift in the center of gravity.”

“Sanctification is a work of God’s grace, yes,” she says — “but it also takes place in a human person. So how can we bring these two together?”

“When you really dive in and look at what sanctification is in the nuts and bolts, it actually, I think, is something that fits more in our sense of who we are, as human beings, than we would have anticipated before. The doctrine of sanctification has something to contribute that virtue theory deemphasizes, or doesn’t contribute.”

In *Responsive Becoming*, Carpenter looks at three influential theologians: John Calvin, John Owen and Horace Bushnell. But because moral formation cannot be divorced from human nature and human transformation, she takes an interdisciplinary approach to thinking deeply about who we are as human persons.

Her book includes findings of evolutionary anthropology, which she characterizes as a way of thinking about the history of how humans change over time, and hence a source of insights about who we are today. She integrates developmental psychology, too, and finds in it a particularly helpful model for the formation of children through their parents’ care.

“I noticed a striking similarity between the way John Calvin talks about sanctification and the way

developmental theorists who are engaging a lot of the evolutionary research are talking about human formation,” she says.

Carpenter sums up theologians’ shared understanding like this: “Human formation is relational, and it is grounded in love.”

“Calvin talks about the core of sanctification as the recognition that God is a loving father,” she says. “Developmental psychologists have really emphasized the early stability of the parent-child relationship as crucial for everything that follows. If children don’t receive the care, stability and unconditional love that they need early on, that sets up a really bad life trajectory.”

A child’s development into mature adulthood is among the clearest examples of this sort of relational context for moral formation, in which the child “becomes” in response to the love of others. In this way, Carpenter notes, we can begin to see how sanctification is not something that simply happens to us, from outside of us — but takes place within the context of a meaningful and loving relationship.

“What Calvin is describing in sanctification is essentially a life that’s transformed through fellowship with God in Christ. This is something that is not entirely mysterious (though when we are talking about God we are always talking about mystery to some extent). But it is intelligible or recognizable as a human process,” Carpenter says.

“Sanctification is not something that’s passive, where God does everything and the human person just sits here and does nothing. It’s relational. It’s responsive.”

Carpenter has begun another book from an interdisciplinary perspective; she’s building on some of the same ideas to consider the relationship between social ethics and the doctrine of grace. “A lot of critics of Protestant ethics have said that it tends toward passivity or inaction,” she says. “But I want to say that the Protestant, particularly Reformed, doctrine of grace implies its own social ethic.” Her 2019 work on this project was supported by a grant from the John

Templeton Foundation. Her book in progress has the working title *Social Ethics and Graced Identity* and is under contract with Baker Academic. ✍️

— By Josh Bishop | Photo, Steven Herppich



*In a related essay, “Independent Reason, Faith, and a Distinctively Human Wisdom,” Dr. Carpenter explores how it can be helpful for theology and science to engage one another. You can read it online at [spera.hope.edu/carpenter-essay](https://spera.hope.edu/carpenter-essay)*

# For This Medical Device, Paper May Be Just the Ticket

KENNETH BROWN, PH.D. | PROFESSOR OF CHEMISTRY



A pricked finger, a drop of blood, a glucose level readout.

The routine is familiar to anyone with Type 2 diabetes, and a team of researchers at Hope is working to shake it up. Not the prick to the finger, but to the wallet.

Over two months in mid-2019, Dr. Kenneth Brown noticed that the price of diabetes blood-glucose test strips tripled. He's been working for three years to reverse that trend.

"Currently, the test strips are made out of plastic," Brown says. "What we would like to do is look at using paper as a platform. That could significantly lower the cost of the test strips. Some companies charge as much as \$2 per test strip" — and patients require two per day. Brown hopes to reduce the unit cost to 5 cents.

The platform — the structural material of the strip — is key. It is the track for a relay race of sorts that brings glucose data from a drop of blood into a monitor to generate a legible readout.

Blood carries all sorts of nutrients, including glucose, around the body. Some individuals with diabetes don't produce enough insulin to take that glucose out of the bloodstream and into their cells, where it can be used immediately for energy or stored for later use; for others, the problem is insulin resistance, which occurs when cells in muscles and fat don't respond well to insulin. Consequently, people who have diabetes must monitor their blood-glucose level and inject insulin — or take oral medication — to compensate.



Monitoring is a seven-second process that starts with insertion of a testing strip into a glucose meter. Next come a finger prick and application of a drop of blood to the testing strip. Glucose in the blood reacts with an enzyme that during the manufacturing process was applied to the strip's polymer-coated platform; the enzyme triggers the oxidation of glucose, which releases electrons. The displaced electrons are transferred through the polymer coating to the strip's end and "read" by the meter's electrodes. The device displays the glucose level in numeric form.

"The significant breakthrough is that we can make our polymer coatings onto a paper-based platform," Brown says. "The compound we're using is not commercially available, so we synthesize a carbon paste in our lab and that is applied to the paper. We then use electrochemical techniques to form polymer coatings on paper via the carbon paste."

Other scientists are working on different innovations, including a device that attaches to one's arm or shoulder and continuously monitors one's blood-glucose level, sending updates directly to a smartphone. The drawback is that such devices work for a period of perhaps 10 days before the entire machine needs to be replaced—at a cost of about \$100, substantially more than 10 days' worth of test strips. "I do believe that the work that we are doing could have a very significant impact upon those who are in a place where these test strips are a medical necessity," Brown says.

For 12 years, since receiving his diagnosis of Type 2 diabetes, Brown has been one of those. His research may have saved his life; it certainly contributed to his diagnosis. "What really prompted me to go to the doctor was that my students noticed what was going on," he shares. Brown's energy level was getting unpredictable; his clothes were getting baggier. His students connected the dots.

"My research would not be possible without my students," he says. "I don't think of my students as working for me, but rather they're working alongside me." That partnership has resulted in a functioning prototype of a paper-based test strip, whose durability and functionality Brown and his student research assistants hope to improve. He envisions a strip that could someday be used for more than one glucose reading, and for an even more accurate reading.



Each test strip packs an impressive amount of technology for a tiny, single-use object. "When you think about all the different chemicals that are in the body, being able to detect glucose in the presence of all these other molecules is a very challenging problem," he says. "One of the goals is to make this process easier."

Brown's project began with the polymer coating — the material on the test strip that allows for the detection and measurement of glucose in a drop of blood. The project evolved to tackle improving the detection capability of the coating, create a paper based platform for it, and increase the durability of that platform.

Brown has a favorite quote, familiar in Reformed circles: "Where your talents and the needs of the world cross, there lies your vocation."

"When I read this, I think about the cross of Christ," he says, "because the cross of Christ is an intersection between humanity and God. I think about the gifts that God has given us; one of those gifts is knowledge. Every day, we are learning more and more about the human body. That tells me about the infinite God we serve." Serving God through teaching and learning, working alongside student researchers, is a calling and a mission — one that Brown intends to have outlive him.

"My motto is: 'Success without a successor is failure,'" Brown says. "And for me, that's part of a faith dimension. Seeing my students go out and do much more than what I've done — seeing them impact the world for good — speaks volumes of what Hope instills within students." 🍀

— *By Natasha Strydhorst | Photos, Steven Herppich*

*Read about Hope students' role in Dr. Brown's diagnosis at [spera.hope.edu/brown-research](https://spera.hope.edu/brown-research)*

# East and West, Body and Mind, T'ai Chi and Philosophy

ANDREW DELL'OLIO, PH.D. | PROFESSOR OF PHILOSOPHY

When Dr. Andrew Dell'Olio was a senior at Rutgers University, a professor there taught t'ai chi ch'uan in the campus square. Though Dell'Olio didn't join in, he recalls observing the meditative martial art; he found it quite beautiful. Within a year, the budding philosophy professor, by then a graduate student at Columbia, had enrolled in a t'ai chi school founded by a senior student of Cheng Man-ch'ing, the man most responsible for spreading t'ai chi to the West. It was then that Dell'Olio's future blending of Western and Eastern philosophical priorities started to graft together.

While his main professional specialties have been ethics, the philosophy of religion and the history of Western philosophy — especially the moral philosophy of Thomas Aquinas, and the changes in Anglo-American

philosophy in the early part of the 20th century — Dell'Olio also has an abiding interest in Asian philosophy. “I think, in general, knowledge of other traditions helps illuminate one's own tradition and vice versa,” says Dell'Olio, who directs Hope's Asian Studies program.

Committed to disciplined training of both the body and the mind, he has taught t'ai chi in Hope's Wellness Program since 2007.

“T'ai chi helps one develop balance, mindfulness, sensitivity to others, gentleness, integration of emotion and thought, and harmony with the energy of the earth and divine source of this energy,” he says. “These are qualities that one aims for in moral self-cultivation.”

They are qualities of the soul, or spirit, that Eastern and Western philosophies traditionally aspire to achieve, too. Dell'Olio made that the theme of World Philosophies, a class he developed with the support of a Mellon Grand Challenges Initiative grant and taught for the first time in 2019. He folded the practice of t'ai chi into the coursework.

As Hope's philosophy professors prepared to host a fall 2019 conference of the Society of Christian Philosophers on the theme “Uniting Mind and Body: Cognition, Embodiment and Liturgy,” Dell'Olio began work on an article on t'ai chi and moral philosophy.

“The notion of ‘embodied cognition’ has caught the attention of contemporary philosophers. Drawing on recent work in both the philosophy of mind and neuroscience, philosophers are exploring the bodily dimensions of our mental processes, including our moral judgments,” he explains. “I hope to explore ways that the literature on embodied cognition can help us better understand how the practice of t'ai chi can assist moral development — and in turn, how t'ai chi can shed light on the nature of embodied cognition. It strikes me as a nice blending of both East and West, old and new.” 🍵

— By Eva Dean Folkert | Photo, Steven Herppich



# One Musician's Global Mixology

MIHAI CRAIOVEANU | PROFESSOR OF MUSIC

Almost any instrument has the capacity to express a variety of musical genres: classical, jazz, folk, blues, Latin, pop. It's a musician's choices of style and repertoire that let the variation out. For instance, take the violin — or should we say fiddle? To differentiate them, don't look; just give a good listen.

At the “Violin vs. Fiddle Gala Concert” at Hope College in 2019, in both a classical set and a fiddling set one virtuoso performer revealed the versatility of the violin. Professor Mihai Craioveanu was that fiddler, violinist, musician.

As all three, Craioveanu has been the impetus behind annual events in the Jack H. Miller Center for Musical Arts, like the standing-room-only “Violin vs. Fiddle” concert, that blend musical traditions, styles and performers from around the world. He does it, he says, “to give audiences a kind of synthesis of what it means to travel around the globe onstage.”

Since the Jack H. Miller Center opened in 2016, Craioveanu has brought a world of music to Hope by conceptualizing, organizing and then harmonizing for concerts funded by grants from the Hope College Patrons of the Arts, Cultural Affairs and Netherland-America Foundation. Each eclectic event features an unusual mix of people, instruments and repertoire. He started with “East Meets West on a Tango” in 2016; moved on to “Bach to Broadway” in 2017 and “French Connection: 300 Years of French Music from Baroque to Jazz” in 2018; and for 2019's “Violin vs Fiddle Gala” created a program of pieces inspired by jazz, tango, bluegrass and the folk tunes of several cultures.

This year's concert on March 23, “Playing the Violin on the Silk Road,” will feature music from China, Japan, Armenia, the Middle East, Greece and Italy. “The ancient Silk Road was a land and maritime trading route that started in China and then spread throughout the world,” Craioveanu explains. “The music will feature the musical traditions from most of the countries that the Silk Road touched.”

As musical director, he enlists renowned musicians to collaborate with him on instruments as diverse as the



music requires: accordion, bandoneon, mandolin, guitar, piano, string bass, bouzouki, erhu, koto. He's delighted that Masayo Ishigure, whom he describes as “perhaps the best living koto player in the world,” will be among the guest artists participating in the Silk Road concert.

Directing the musicians as they rehearse the diverse pieces together for the first time is exhilarating, he says. “We do our due diligence in our home studios and then we rehearse together here. They arrive at Hope one or two days before the concert. That teamwork, that click has to happen in 24 hours — no more than 48, that's for sure.” 🎻

— By Eva Dean Folkert | Photo, Steven Herppich

*“Playing Violin on the Silk Road” will begin at 7:30 p.m. on March 23 at the Jack H. Miller Center for Musical Arts on the Hope College campus. Admission is free.*



# Mathematical Nature and Natural Math

BRIAN YURK, PH.D. | ASSOCIATE PROFESSOR OF MATHEMATICS



On a table in his office in VanderWerf Hall, a popular recent memoir about hiking the Appalachian Trail sits alongside Dr. Brian Yurk's mathematics papers and journals. The presence of each offers empirical evidence of how the applied mathematician's love of nature is combined with his love for his work.

He's a backpacker, climber, skier, ultra-runner, mountain biker, canoeist and a fan of Bill Bryson's *A Walk in the Woods*, and when he sees a mathematical problem in the environment, he wants to solve it. In much of his research, he applies mathematics to biology and geology: analyzing dune movement, studying animal-population patterns and handling the quantitative component of plant-succession surveys related to gaps in the Costa Rican rain forest canopy caused by wind or landslides.

Yurk has been involved in that last project for nine years with Hope colleague Dr. K. Greg Murray, the T. Elliot Weier Professor of Plant Science. In the early 1980s, Murray originated the research on gaps in the rain forest canopy near Monteverde, Costa Rica. Yurk

got involved in the project when Murray sought help to unearth mathematical matrices that can explain the rates at which gaps could close due to the growth of pioneer plants below. The goal of the research is better understanding of this natural dynamic.

Murray and Yurk track the number and size of gaps, and of different pioneer plants found in those gaps along five transect lines they've defined in the forest, each 500 meters long. "We look only at plants that are within two meters of the transect," Yurk explains. "We look at any new gap that crosses the transects, too. There are actually ropes that Greg has out there and then replaces every few years."

Employing those data, Yurk uses linear algebra to create a matrix model that extrapolates plant growth and reproduction and mortality rates to forecast future population dynamics. "The mathematical theory allows us to make predictions based on the characteristics of this matrix as to what the long-term distribution should be," says Yurk.



The variables are many: sun exposure, air temperature, seed banks, soil nutrients and more. So the project's complexity is ample, too. But asking and attempting to answer fundamental questions about how the rain forest works when gaps emerge is a driving force that keeps Murray and Yurk interested after all this time. In no way do they intervene in the forest's growth, nor are they advocating for intervention. In fact, for a number of the areas they study, the more slowly the gaps close, the better it is for the plants and the animals who live in them.

"Those plants are important sources of food, particularly for birds and bats," Yurk says. "And as such, they're an important part of the food supply for every animal in the food chain in the rain forest. That's why it's important to understand what's going on with and in these gaps."

While the Hope duo has gathered data on site in the same five transects for a number of summers, Yurk is looking to expand their reach. He received a Michigan Space Grant in 2019 to use satellite imagery to identify gaps. "Instead of just working along these five lines, now we can work over the entire forest area," he exclaims. "Then we'll have more gaps that we can analyze and we can do a lot of it remotely."

Yurk used the summer of 2019 to test his satellite concept by writing a computer program that automatically identifies canopy gaps in high-resolution imagery. First, he scoured satellite images for gaps with his own eyes; then he trained a computer algorithm to pick out the gaps that his human eyes saw. "The big remaining questions were these: *If I'm identifying those things correctly visually, is the algorithm picking out the same gaps, too? Is there actually a gap there in the forest? On the other side of that, if the algorithm doesn't identify a gap, is that right as well?*"

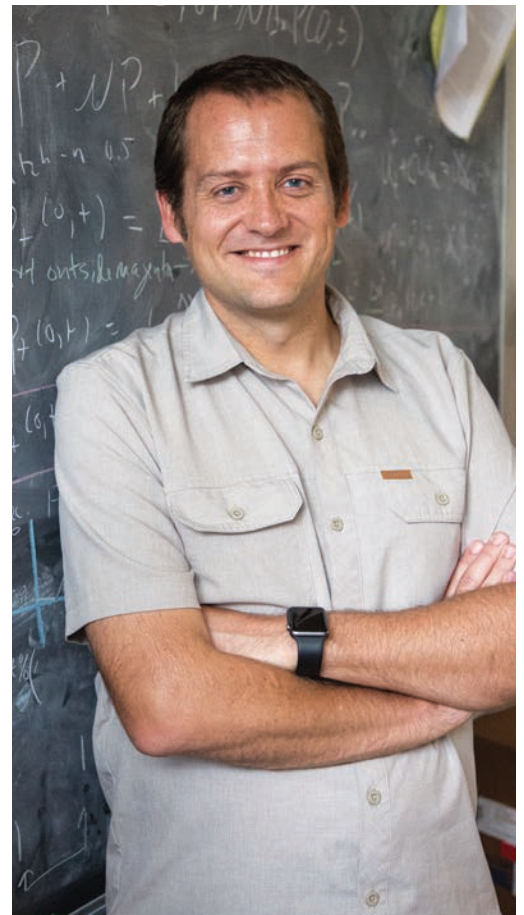
Then he put it to the test in Costa Rica by hiking into 100 extremely remote locations, 50 of which had been identified by the algorithm as a gap and 50 of which had not. The results were encouraging. Of the 50 gaps that the algorithm picked out from the satellite imagery, he was able to confirm 47 visually from the ground. And of the 50 areas that the algorithm identified as not having gaps, at 47 of them he spotted no evidence of gaps as he gazed up from the rain forest floor. "So, what the algorithm was picking out was matching my visual identification, which was matching up in the field with a fairly high degree of accuracy," he says.

Through every environmental and mathematical project, Yurk's desire to study the natural world mathematically has interacted with his Christian views. "To understand creation — that's always been an important part of how I think about my work," he says.

In the coming years, with plenty of rain forest gaps to study and explore, Yurk will undoubtedly be able to think about math, nature and faith even more. 🌿

— By Eva Dean Folkert | Photos, Steven Herppich and Dr. Brian Yurk

View more photos at [spera.hope.edu/yurk-costa-rica](https://spera.hope.edu/yurk-costa-rica)





# PREPARING TEACHER EDUCATION CANDIDATES TO CONNECT ACROSS CULTURES

YOOYEUN HWANG, PH.D. | PROFESSOR OF EDUCATION

SUSAN CHERUP, M.A. | ARNOLD & ESTHER SONNEVELDT PROFESSOR OF EDUCATION

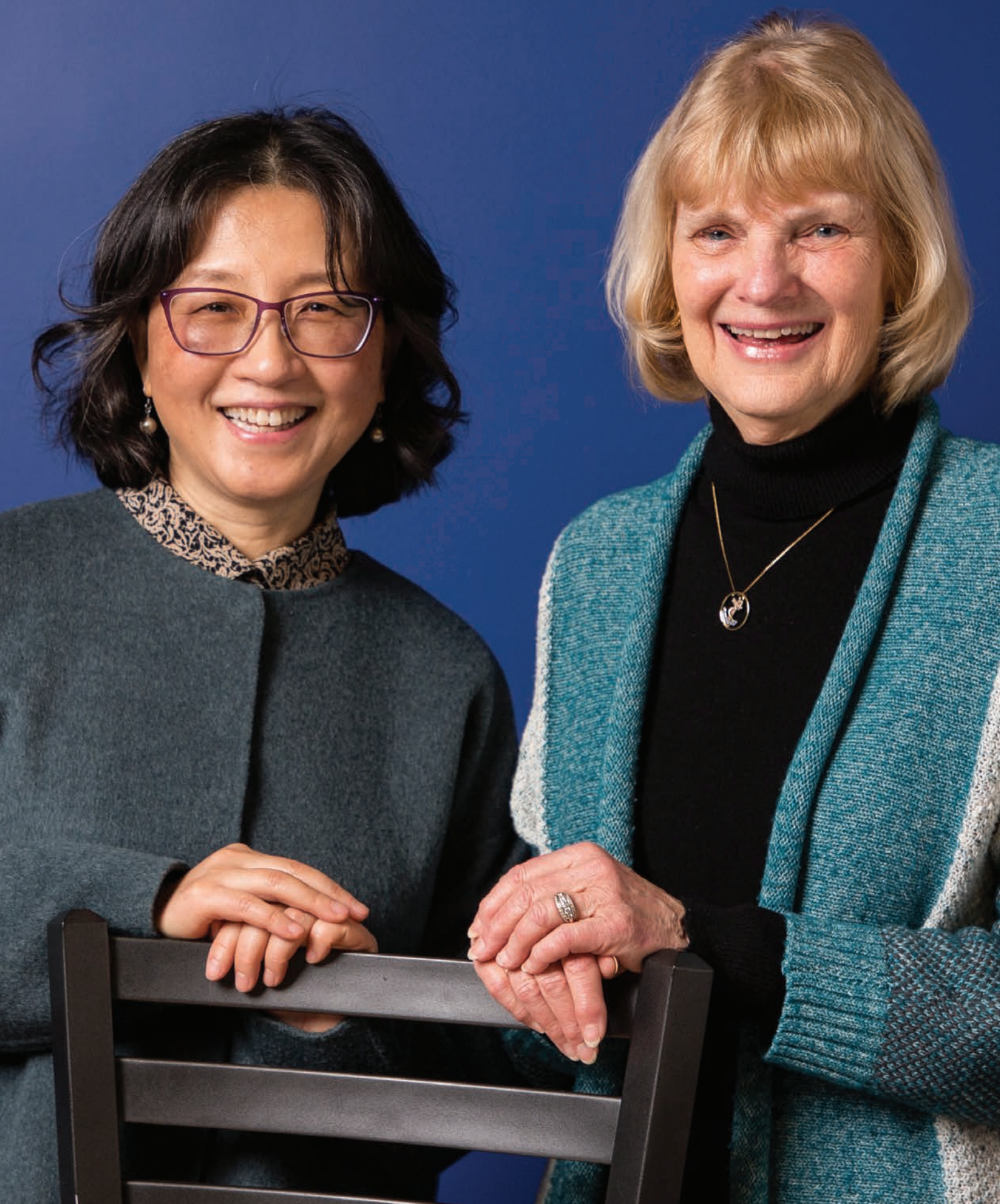
At Hope, the course Encounter with Cultures heightens teacher education candidates' understanding of how ethnicity, culture and gender play out in day-to-day life. Later, when as teachers they relate to students whose lives can be radically different from their own, they draw on the critical thinking they learned about racism in America and the impact of the course's array of cross-cultural experiences that took them into new, sometimes uncomfortable, contexts — from their first Chinese meal to experiences in a church or a neighborhood they might not otherwise have ventured into. Dr. Yooyeun Hwang has taught the class for 23 years, and Professor Susan Cherup for six.

**“Dr. Hwang:** Future teachers need not just intellectual learning, but also a social experience to develop a moral understanding of human relations, which will motivate them to learn about others. It opens their eyes to how some people are more privileged — have more power or less power — more money – more opportunity.

**Professor Cherup:** For a Hope student who is neither Roman Catholic nor a Spanish speaker, attending a local Holland church which celebrates Mass in Spanish would probably be uncomfortable, not because it would be unwelcoming but because the student is inadequately prepared. These required ‘outside experiences’ will help future teachers in immeasurable ways. **”**









# Shifting Chemistry into Reverse

JEFFREY JOHNSON, PH.D. | PROFESSOR OF CHEMISTRY

From the outside peering in, a great deal of organic chemistry looks like salt and water: white powders and transparent liquids.

Yet this branch of science is prolific in creating the things we use every day — toothbrushes, medications, milk jugs and other ubiquitous consumer products. The field has built these things so well, in fact, that many of them are incredibly hard-wearing (such as plastics that will hang around for centuries and drugs that cycle through waterways without completely breaking down). At the molecular level, the credit goes to the stability of the carbon-to-carbon bonds that hold these things together.

Usually, “organic chemistry is concerned with building these bonds — not taking them apart,” notes Dr. Jeff Johnson. But his Hope College research group is running in the opposite direction.

“The research that we do in the lab asks the question: *How do we take carbon-carbon bonds and split them apart?*” Johnson says. “Breaking carbon-carbon bonds is very, very difficult to do in any controlled fashion. And even when you can do it, turning that molecule into something else that could also be useful is incredibly challenging.” If this bond-breaking were to become possible, however, useful products would almost certainly result.

Johnson likens carbon-carbon bonds to the solid structure of a cinder block room. “The framework of a molecule is made from carbon-carbon bonds,” he says. “It’s like an elementary school gymnasium, in that it’s really easy to change the surface: You can put up posters, and you can paint it different colors. But ultimately, the walls of the gymnasium are still the same. What happens if you want to expand the gymnasium and make room for a second basketball court? You’d have to knock down a wall and push it out — and it’s almost impossible to do that without just building it from scratch. Essentially, organic synthesis is like that.”

Johnson and his student research assistants are in search of methods that would allow them to break down the walls efficiently. “What our method would do is allow us to selectively take some cinder blocks out and then put in a window or that second court,” Johnson says.

But why go to all this effort, simply to break something down? At the microscale, the breakdown of products can be just as creative a process as their building-up. A chemist who breaks a piece off a molecule is left with two different molecules — and each one could be valuable.

“We’re not looking to make a specific product or a specific pharmaceutical,” Johnson says. “We’re looking to make a tool that other chemists can use as they’d like.” Such a tool would allow scientists to rearrange molecules, chopping off a piece here and there to liberate completely new products.

Johnson sees a particular value for this method in the realm of drug development.

Currently, if a molecule proves effective against a cancerous cell line, it’s not always clear which part is actively achieving that effect. “For a complex molecule, we have to make the right-hand side, and we have to make the left-hand side, and test each of them separately, which takes a lot of steps,” Johnson says. The alternative approach he envisions would be to simply chop the molecule apart and test each piece for the desired property. Technology that would allow chemists to selectively extract pieces of larger compounds would allow the examination of many more molecules in a shorter timescale, potentially increasing the rate of pharmaceutical discovery.

In the summer of 2019, Johnson’s team made substantial headway toward their goals of both measuring the rate of breaking those carbon-carbon bonds and developing new ways to do it. It’s on these goals that Johnson and his team are focusing in this research supported by a



three-year, \$275,855 grant from the National Science Foundation.

“Typically,” Johnson says, “the activation process goes through a certain pathway. Because we now know how that pathway works, we can figure out how to stop the pathway partway through and create a new product — or to get it to react with something else, and go in a different direction.” On a relatively small scale, this is already happening.

“We’ve proven to ourselves that we can do this,” Johnson says. “But now, instead of getting 10 percent of the material to make the new product, how do we get 90 percent?” The complexity of developing new reactions that work with a wide variety of compounds is a perennial challenge for organic chemists. Making it all the harder is the fact that Johnson and his student research assistants can’t visually observe these reactions, so their experimental process must rely on other methods of scientific assessment.

“That’s always a challenge, particularly for beginning students,” Johnson says. “The vast majority of things in organic chemistry are colorless liquids and white solids, and we often work with very small amounts. Ultimately, it’s getting students to trust things besides their eyesight.” It’s about teaching — and learning — new methods of observation, including the use of complex instruments that use infrared, radio waves or electrical current to provide information about unseen molecules.

“One of the major things that you learn as a research scientist is that it very, very, very rarely works how you expect it to,” Johnson says. “But when you’re pushing the envelope, you need to keep your eyes open and your head up. A heckuva lot of failure goes into every success.” 🦋

— By *Natasha Strydhorst* | Photo, *Steven Herppich*

*Dr. Johnson talks about his research at*  
**[spera.hope.edu/johnson-research](https://spera.hope.edu/johnson-research)**



# Investigating How Cells Recognize Good and Bad Fats

VIRGINIA McDONOUGH-STUKEY, PH.D. | PROFESSOR OF BIOLOGY



We may have to check the nutrition label to know the amounts of saturated and unsaturated fats we're consuming, but for our cells, this tallying is second nature. Scientists have known for years that cells absorb, process and use fats; that they can change saturated fats to unsaturated ones; and that they recognize the difference between the two. What remains a mystery is just how they make that distinction.

That's what molecular biologist Dr. Virginia McDonough, a professor and researcher at Hope since 1995, wants to find out. She and her students have been studying the way that cells recognize and respond to the presence of saturated fats (commonly called "bad" fats) and unsaturated ("good") fats. McDonough's research group is tantalizingly close to understanding our cells' approach to doing this and has identified some key components of that process.

"We have found quite a few of the proteins that work as part of the system," McDonough says. "We know a lot of the pieces; we just haven't put the pieces together into the puzzle yet." A three-year, \$246,972 National Institutes of Health grant awarded in 2019 funds the current phase of her long-term research.

"I think people recognize that we're really close to being able to put those pieces together," McDonough adds. "I'm hoping that in the next couple of years we're going to be able to come up with some very nice models of how the system works."

Models — specifically model organisms — have already provided a substantial source of insight for McDonough's lab (and for science more broadly). By mutating select genes in yeast — a common model organism — McDonough and her team disrupt the ability of the cell to produce some specific proteins.

This makes that pathway dysfunctional and impairs the cell's ability to metabolize fat. Once McDonough identified some of the proteins involved in the fat sensing/regulating system, the next step was to disrupt them through this selective gene mutation and observe the results.

"We're trying to study how the system should work normally," she says. "We do that by probing it when it's not working normally, and then figure out what's gone wrong."

When fat metabolism goes wrong in human cells, a whole host of disorders can follow. Obesity, diabetes, cardiovascular disease and certain cancers are all linked to dysfunctional fat metabolism.

One of the things McDonough knows throws off cellular fat metabolism is a glitch in the so-called "chemical switches" that regulate the production of an enzyme — known in biochemistry circles as stearoyl-CoA desaturase — that converts saturated fats into unsaturated ones. When functioning properly, the chemical switch (or switches, as the case may be) turns off production of the enzyme when the cell has enough unsaturated fat.

McDonough likens the process to a bucket brigade: "There are proteins that are recognizing something that has to do with the diet, and they're telling other proteins, 'There's plenty of unsaturated fats; you should shut down expression of the desaturase — we don't need it.'" Conversely, a second switch could tell other proteins to restart the desaturase expression when unsaturated fat levels drop. The switches, working in alternate shifts, keep the cell's lipid (fat) levels optimally balanced.

"We know that [the chemical switches are] there, because we can see the effect," she says. "We just don't know what they are or how they work." To narrow the search, she and the Hope students in her research group are targeting the beginning of the desaturation process. "I'm pretty confident that there are switches early in the process, based on some of the previous work that we've done," McDonough says. "So we should be able to find them." Once found, these switches can be plugged into the lab's burgeoning model of how the desaturation process, and the regulation of that process, work. The puzzle will be one piece closer to its resolution.



McDonough is occasionally asked, "*Why not just study cancer? Why focus on the brass tacks way down at the cellular level?*" Part of the answer is that McDonough has always been attracted by the intricacies of lipid metabolism. "I've always liked lipids. They're sort of the neglected corner, but I've always found them really interesting," she says.

A bigger part of the answer is that much of what affects cancer cells — and, for that matter, patients affected by diabetes, or cardiovascular disease, or obesity — is still unknown. "Early on, nobody thought to look at glucose metabolism," she says, "but once scientists did, we understood how these abnormal cells get their energy to keep dividing. That may give us a clue as to how to treat this disease. You can't just be focused on translational things; you still have to continue the work on basic research."

McDonough also focuses on training others in that work. "I like people to know how important it is for students to have the opportunity to do research, because this is the next generation of scientists, and they need to get their training started — the sooner the better," she says. "Meanwhile, I feel like it's really important for us to continue basic research that we do here, so that we understand how things work — because that lets us figure out why they're broken." ✍️

— By Natasha Strydhorst | Photo, Steven Herppich



# From Industrial Glitch to Research Focus

STEPHEN REMILLARD, PH.D. | ASSOCIATE PROFESSOR OF PHYSICS

One engineer's problem may just be another scientist's solution. At least, that seems to be the case with a curious physics phenomenon known as microplasma.

Dr. Stephen Remillard has seen it from both sides: as a problem during his earlier career as an industrial physicist, and as a surprisingly useful phenomenon now that he's a research-intensive academic physicist.

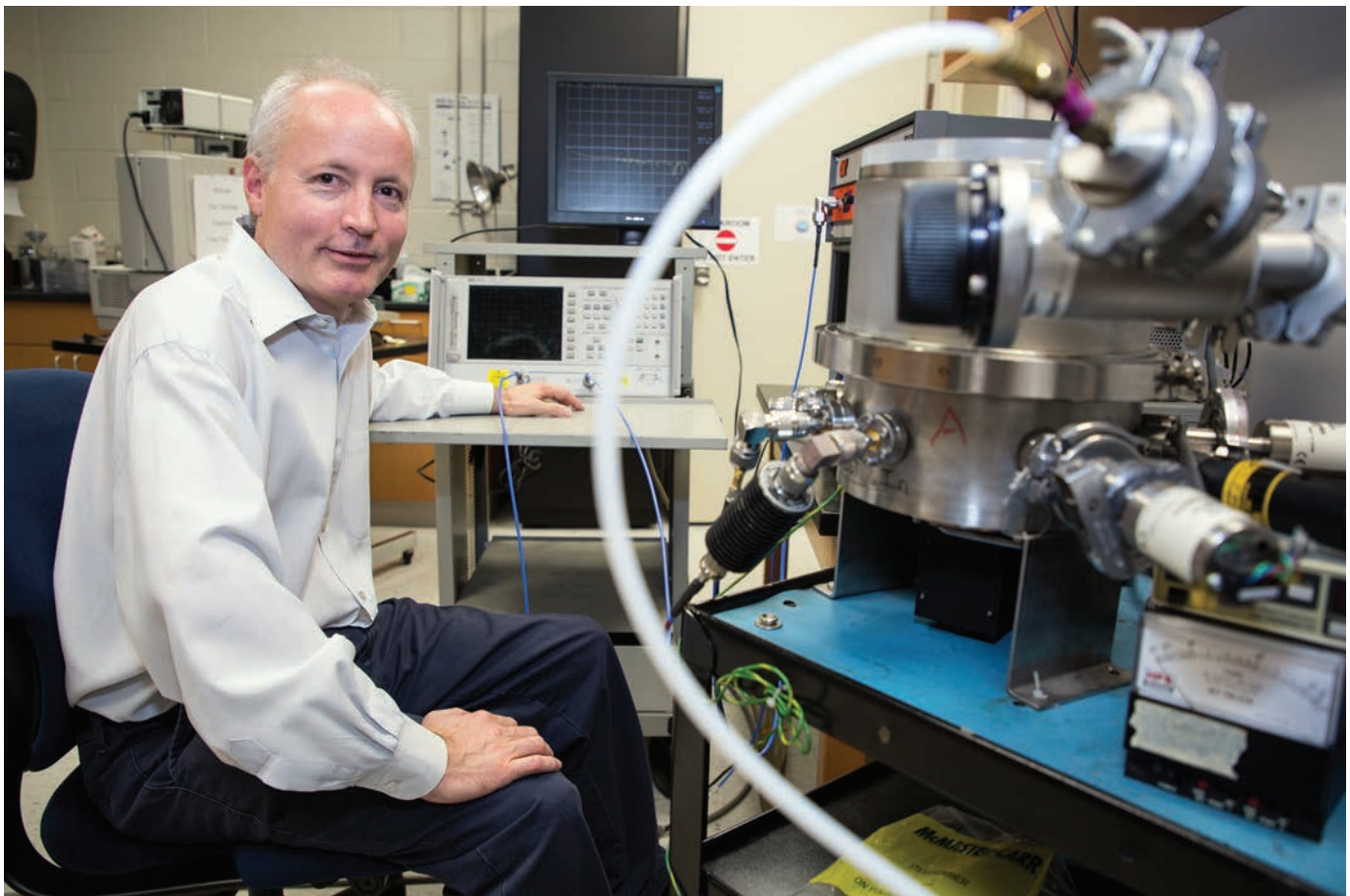
"Plasma is the fourth state of matter," Remillard explains, "and you can envision it as being hot gas, where electrons have been removed from the atoms."

Microplasma is plasma on a miniscule scale. (Think very hot gases in very, very small spaces.) Electrons in the gas reach a temperature of 4,000 degrees Kelvin, or about 6,740 degrees Fahrenheit. The gaps in which microplasma ignites are 10 to 20 microns wide, which is roughly 1 to 2 percent of a millimeter. As it turns out, the reduced size makes for completely different properties.

"Plasma is sustained because electrons crash into atoms in the gas," Remillard says. "If the gas is really small, the electrons don't get a chance to go so fast, so the collisions look different, and the entire physical property of the plasma is going to be different."

Some of these physical properties proved problematic when Remillard first encountered them as a member of an industrial team developing technology for a cell phone base station. Microplasma caused the superconductors he was working on to malfunction.

"When you're an engineer confronted with a problem, you look for ways to get rid of the problem. You don't have a good reason to spend time studying it; that's a scientist's job. When I was working in industry, developing products, my interest was getting rid of the problem," he says. "When I came back to academia, where we're more interested in that question of why stuff happens than we are in how to build stuff with it, I had to shift gears."



Rather than eliminating microplasma, Remillard now creates, sustains and observes it in Hope College's Microwave Lab in VanderWerf Hall. In 2019 his research group topped the \$1 million mark for grants received over the years.

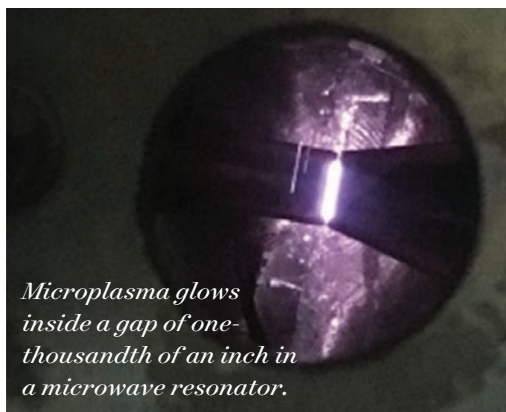
Though it may cause the occasional superconductor to stop working, in the right setting microplasma has a whole host of applications. It can be used in adaptive radio frequency systems, and to sterilize water in resource-poor settings. Scientists are even investigating whether it could speed up wound healing. (The extreme heat, wound patients would be relieved to know, belongs to only a small portion of the microplasma — its electrons. The majority of the gas maintains a more amiable temperature of about 68 degrees Fahrenheit.) The substance's full applicability, however, remains to be studied.

"There's a very limited understanding of plasma starting in very small places," Remillard says. "That's what's neat about microplasma: everything we knew about macroplasmas has to be modified, and that's what we're working on."

The Microwave Group at Hope is in year two of a three-year, \$142,902 grant from the U.S. Department of Energy. With this support, the Hope College group exchanges students with a professor at Grand Valley State University to study how microplasma is generated and what its electrical properties are.

The researchers generate and sustain microplasma using microwaves. Any microwave (like any other wave) has a specific frequency. Remillard and his students have found that when they ignite the microplasma with one of these frequencies, a completely different frequency of microwave energy comes out the other side — for reasons still unknown. "What is that all about? We're trying to understand that."

The phenomenon does have a name, though: harmonic generation. "It's the exact same thing as guitar players talk about, when they talk about harmonic distortion of their amplifier," Remillard says — albeit with sound waves.



*Microplasma glows inside a gap of one-thousandth of an inch in a microwave resonator.*

Once ignited, microplasma is also visually different from macroplasma; it emits a different light, which can be altered by changing the microenvironment. "When we change the conditions of the microplasma — change the size of the gap, change the microwave power, change the pressure of the gas — the light that's emitted changes," Remillard says. "And I don't know why yet. That's a brand new area of research."

Remillard and the students involved in his research have discovered and characterized multiple previously unknown aspects of microplasma. An early achievement was development of a model of how microplasma ignites in the first place.

Since then, Remillard reports, they've identified different behaviors that result under different levels of pressure. "We discovered that there's a certain cutoff pressure, below which there's no microplasma," he says. "I've been told by people working in the field that this has been perplexing them — why they can't get microplasma. Our model describes this perfectly."

The next step will be to develop an even more sophisticated model that incorporates more of microplasma's properties. The research is timely; the smaller that electronic and microwave devices become, the more an understanding of microplasma will be called for.

"As microwave devices shrank and shrank, it became a real nuisance or a real exploitable phenomenon, depending on the situation," Remillard says. A whole new area of research opened up, all from a malfunctioning piece of cell phone equipment puzzled over during a previous career.

"It was accidental. It was unexpected," Remillard recalls. "And that's kind of how science works, a lot of the time: Somebody just says the right thing, and your light bulb goes on." ✍️

— By Natasha Strydhorst | Photo, Steven Herppich



# Hope Goes Viral

BENJAMIN KOPEK, PH.D. | ASSISTANT PROFESSOR OF BIOLOGY

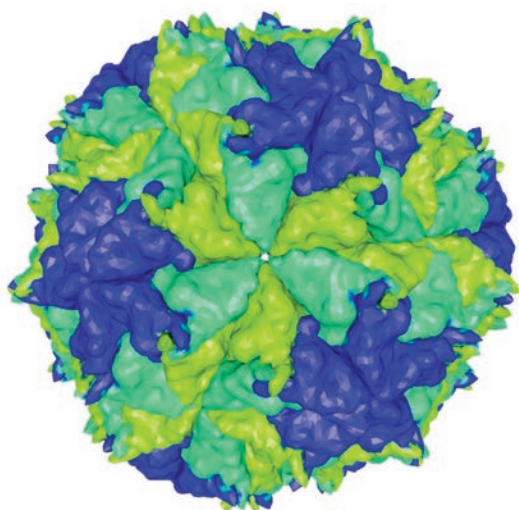
While the fight against viral and bacterial human pathogens stretches back to the dawn of human history, on some fronts we have yet to mount an effective defense. At the nanoscopic level, viruses have been infiltrating and using our cells with impunity for as long as they and we have existed. The battle against pathogenic bacteria that can sicken or kill humans turned the corner in 1948 with the isolation of the first broad-spectrum antibiotic, so named because of its effectiveness against bacteria of both broad classes (gram-positive and gram-negative). But broad-spectrum anti-virals have lagged behind; there are none on the market.

Yet.

Molecular biologist Dr. Benjamin Kopek is working to change that.

“The goal of our work is to eliminate or alleviate human suffering due to viral disease,” Kopek says.

A key to achieving that giant goal may lie in a tiny virus known as Flock House Virus (FHV).



“It’s one of the simplest models in the RNA class of viruses,” Kopek explains. “It works well for our research because it doesn’t infect humans.” It also works well because it nevertheless belongs to the same class of viruses that constitute the majority of human, animal and plant pathogens: positive-strand RNA viruses.

Viruses are typically more difficult to develop defenses against than other pathogens, because they’re insidious in a way that the others are not. Once a virus gains access to a host cell, it hijacks that cell’s replication machinery to reproduce the virus’s own genetic material. Viruses become so inextricably linked to the cells they’ve invaded that efforts to disable them are liable to harm the host cells as well.

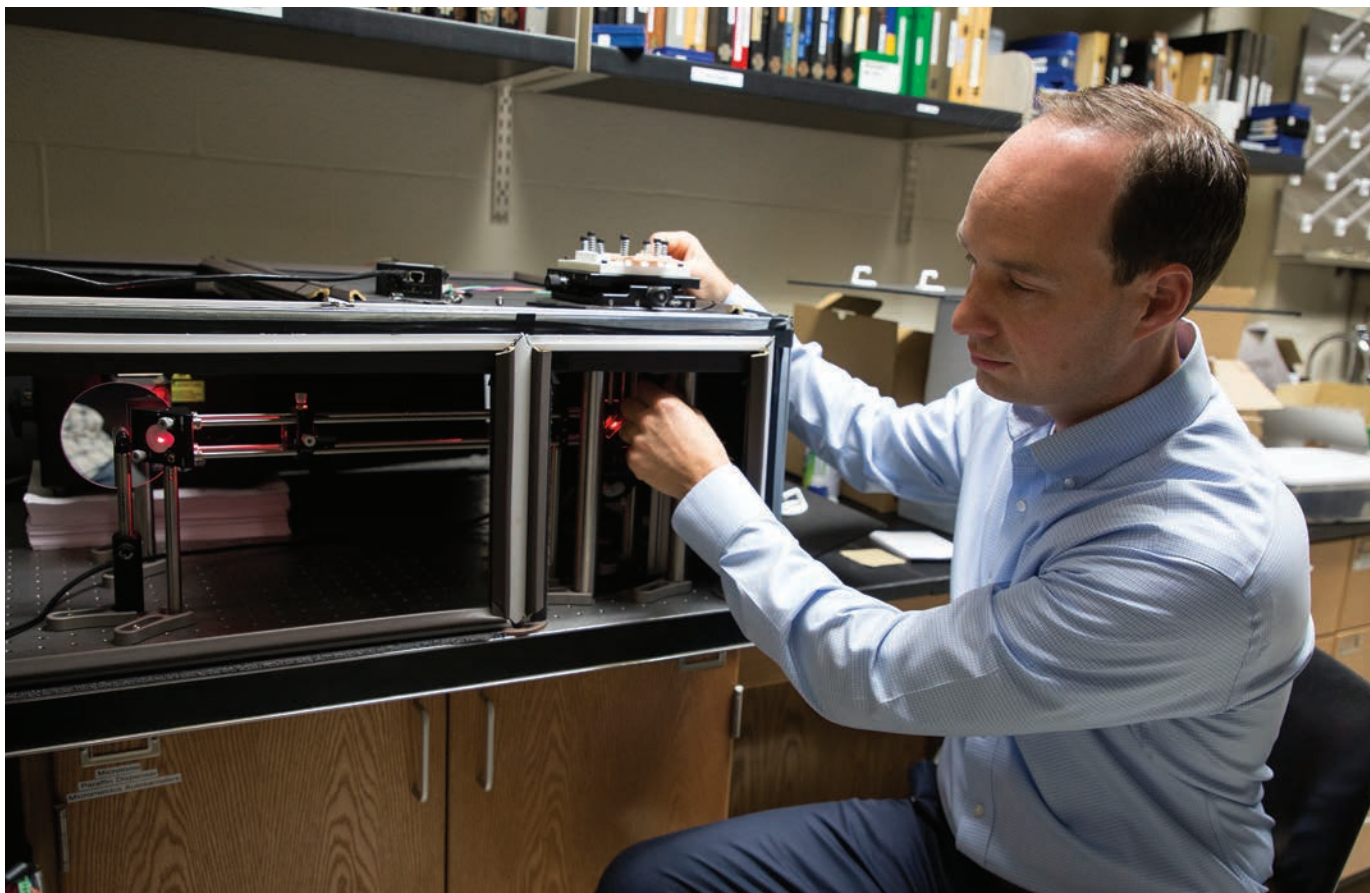
By studying how FHV behaves once it has invaded the cells of fruit flies (which the virus is able to infect and kill), Kopek hopes to discover how FHV replicates itself, what elements of the host cell it depends on for that replication, and how the viral reproduction might be stopped.

This could provide clues about how to stop other positive-strand RNA viruses that share FHV’s replication method. The positive-strand RNA class includes such notorious pathogens as hepatitis C, West Nile virus, Zika and yellow fever — the last of which continues to kill 10,000 people each year, even though a yellow fever vaccine was introduced more than 80 years ago.

“What we’re mostly trying to understand is how it replicates the genome — how it makes more copies of its RNA,” Kopek says.

He and students in his Hope College research group know where replication takes place: in the cellular membrane. (If you recall high school biology class, you may also know it as the “phospholipid bilayer.”) Their research focuses on the lipid aspect of the membrane— the hydrocarbon molecules that are one of the membranes’ building blocks — because previous studies have shown certain lipids to be key components in viral replication.

“We can label the lipids and look at where they are relative to the virus replication factories,” Kopek explains. (His research group labels lipids by attaching fluorescent dyes, and then scrutinizes them under microscopes.) “We can knock out cellular genes using CRISPR to see how that affects virus replication.” Change to the cell’s environment or genetics is observed



through the lens of how the virus (and its replication) responds. Determining how FHV replicates in various conditions could lead to better understanding of its pathogenic cousins.

“If we can find a common way that they all use to replicate, then we can potentially develop a drug against that common target,” Kopek says. A drug against a target common to Zika, yellow fever, West Nile virus and hepatitis C — and indefinite numbers of other emerging and unknown viruses — is patently appealing.


Kopek is a Towsley Research Scholar, selected for a four-year Hope College program that provides funding and dedicated research time to promising researchers on Hope’s faculty early in their careers. He’s keen to support basic science around the world; it is, after all, where vaccines and pharmaceuticals get their start. In that vein, a second major aim he pursues is making research more widely available.

Assisted by Hope engineering graduate Justin Hanselman ’17, Kopek built the super-resolution fluorescence microscope that he uses for his research. As part of the growing open hardware movement, the two also developed a parts list and step-by-step

assembly instructions — so other institutions could build for \$10,000 to \$15,000 a device that, produced commercially, would cost hundreds of thousands of dollars.

“It’s hopefully for the whole world,” he says. “That may not just be underdeveloped nations, but also undergraduate institutions or other specific labs that might not have a whole lot of funding, but have a need for these types of technologies.”

“The takeaway is that we need to support basic science research,” Kopek adds. “It informs our ability to treat human pathogens, and potentially deadly emerging pathogens, that could really be a threat to human health.” Likewise, anti-viral research must begin with the basics, uncovering the ways viruses operate in order to determine just how to stop them in their tracks.

“We need to have ways to understand the basics of this virus class, because there are more viruses out there than we’ll ever be able to develop vaccines against, or even know about,” Kopek says. “We need to do basic science research on this class of viruses so that we’re prepared.” 

— *By Natasha Strydhorst | Photo, Steven Herppich*



## TWO MILES FROM CAMPUS, MEDICAL OUTREACH TO SENIORS

BARBARA VINCENSI, PH.D. | ASSOCIATE PROFESSOR OF NURSING

Years ago, when Barbara Vincensi's work as a parish nurse took her to the homes of low-income senior citizens, it became clear to her that many would be healthier if regular medical monitoring were available to them close at hand. That unmet need stuck with her as she joined the Hope faculty and worked with students drawn to gerontology and community nursing. In 2015, Dr. Vincensi developed a nurse-managed wellness center at an affordable housing complex for senior citizens near the college. One morning a week, residents drop in for health screenings, exercise like chair yoga and balloon volleyball, consultation with Vincensi and with Hope nursing majors enrolled in her Community Health Nursing course, and an occasional community lunch that serves up nutrition education with each bargain-priced meal. Supplies provided by Hope's Department of Nursing and grants from the Community Foundation of the Holland/Zeeland Area and the Perrigo Company Charitable Foundation have helped support the clinic's work.

“The students gain a different perspective on the elderly and on needs in the community. It definitely opens their eyes. For residents, the outcomes include decreased isolation and increased health literacy — and the higher the health literacy, the less likely they're going to end up in the hospital with chronic disease issues. We assess how people are responding to their treatment. Are they taking medications correctly? Are they checking in with their doctors? We assess how they're feeling; isolation is an issue. Mobility and transportation are big issues, too. A Meijer grocery store is across the street, but it could be across the world for them.”







# Telling Past Lives, Tracing Cultural Effects

NATALIE DYKSTRA, PH.D. | PROFESSOR OF ENGLISH

In 2016, when *Boston* magazine ranked the “100 Best Bostonians of All Time,” Isabella Stewart Gardner came in fourth — just behind John F. Kennedy and right before Malcolm X. The wealthy, influential Gardner (1840–1924), whose eponymous art museum is a Boston must-see, transformed the city’s cultural landscape more than a century ago by being, as the magazine described her, a “patron of the arts, maverick, feminist.”

Dr. Natalie Dykstra spent 2019 in Boston immersed in research and writing for her biography of Gardner, which Houghton Mifflin Harcourt is to publish in 2023. Gardner created an opulent, groundbreaking, world-class art museum which opened in 1903 to be, in perpetuity, “for the education and enjoyment of the public.” In her will she directed that none of its contents could ever be rearranged after her death. She stood shoulder-to-shoulder with her husband, the businessman and philanthropist John Lowell Gardner Jr., and with revered figures of her day including novelist Henry James, historian Henry Adams and painter John Singer Sargent. Her strong vision, opinions and work ethic catapulted her to a place of social and cultural curiosity and acclaim. Even so, Dykstra says, “though Isabella’s legacy is feminist, it is misreading her to imagine her as a feminist in the way that we understand that word today. She did not join suffragette causes or social action committees for equal pay. Instead, she tried to change her world through the arts and gave quietly to other causes that protected the most vulnerable in society: children and animals.”

In collecting for and establishing her four-story museum, called Fenway Court in her day — a pursuit that lasted decades and took her on months-long trips to Europe and Asia to do her collecting — Gardner was a sometimes boisterous and always determined force to be reckoned with in a male-dominated art world.

She was the first collector to bring paintings by Vermeer and Botticelli to the United States.

She outmaneuvered collectors with deeper pockets to purchase masterpieces by Titian, Raphael and Rembrandt.

She was the first to design and erect a museum building specifically for a personal collection.

She did so by being, in Dykstra’s words, “a savvy entrepreneur” and “incredibly smart.” She lived life on her own terms, no matter the cultural currents for women at the time.

“Isabella somehow was able to resist the messages, spoken and unspoken, to not do what she was doing,” Dykstra explains. “Sometimes I think people say, ‘Well, she was wealthy, so she could do what she wanted,’ but that’s not entirely the case. She was taking risks in doing what she was doing. She was stepping out of a prescribed role for women. And actually, those prescriptions for how to behave sometimes intensify with wealth. They become more elaborate. So, I think she was very, very brave to follow something inside herself that was very powerful, even though that’s more 21st-century language than she would have used.”

Much of Dykstra’s research takes place at the Gardner Museum Archives, the Massachusetts Historical Society and the Houghton Library at Harvard University. She also has retraced Gardner’s footsteps through Paris, Venice and Florence, and met on a private island off the coast of Maine with descendants of the Gardner family to unearth new insights about her subject’s life. With each journey and conversation, Dykstra becomes more and more impressed by Gardner’s through-line from early loss (her only child, a son, died at the age of 20 months) to triumph. “She had an extraordinary life, with great sorrow, too, but somehow that sorrow did not unmoor her. Her capacity to enjoy life and her response to beauty is what’s so memorable about her, and is why I’m drawn to her story,” Dykstra says.



As are over 300,000 visitors to the Gardner Museum annually. A younger generation is attracted to the maverick, “who was unapologetic about what she was doing,” Dykstra says. “The museum is popular with millennials. It’s packed on Thursday nights, when it’s open late. It’s like Thursday date night in Boston. I think young women and men adore it. I think they think she’s cool and strong and glamorous and distinctive. And I think they understand her entrepreneurial spirit and the risks that she took.”

This is Dykstra’s second biography of an elite Boston woman. Her first, the Massachusetts Book Award finalist *Clover Adams: A Gilded and Heartbreaking Life* (Houghton Mifflin Harcourt, 2012), tells the story of a photographer who struggled to find her way and met a tragic end when she took her own life at the age of 42. Gardner’s story is just the opposite for its subject’s

longevity and assuredness. While writing *Clover Adams*, Dykstra earned a National Endowment for the Humanities Year-Long Fellowship; in 2019 she received another year-long NEH fellowship, this time a Public Scholar Award, for her work on the Gardner biography.

“The book about Clover was a kind of chamber piece,” Dykstra reflects. “It was a ghost story, very intimate and in a constrained time frame. Isabella lived twice as long as Clover. And the way she lived makes her story like a full-on orchestra backed up by many choirs.” 🎻

— By Eva Dean Folkert | Photo, Matt Teuten

View images and learn more about the Isabella Stewart Gardner Museum at [gardnermuseum.org](http://gardnermuseum.org) — and visit [nataliedykstra.com](http://nataliedykstra.com) for more on Dr. Dykstra’s upcoming book.



# Sitcoms, Fake News and Collective Memory

CHOONGHEE HAN, PH.D. | ASSOCIATE PROFESSOR OF COMMUNICATION



Dr. Choonghee Han believes every nation has a time in its collective past that it would just as soon forget.

In America, for example, it could be Vietnam.

“There have been lots of discussions and publications about the Vietnam War, how it was interpreted or digested by the public through the media,” says Han. “It was a very painful chapter in this country. Scholars have written that because it was painful, we tried to forget it. For many, many years afterward, people didn’t want to talk about it. We subscribe to concocted memory. We buy into it. That gives us a very interesting human behavior pattern of forgetting and remembering.”

“Memory is never set in stone,” he declares. “It always fluctuates. It’s messy and it’s dirty.”

That pattern is more pronounced and brazen in East Asia, Han says; the South Korean and Japanese authorities rewrote, or in some cases omitted altogether from the public record, memories of forced prostitution, genocide and other atrocities that occurred as a result of Japan’s occupation of Korea before and during World War II. (We might call it “fake news” today.)

Before moving to America and entering academia, for 12 years Han produced TV and radio documentaries for the Educational Broadcasting System (EBS), South Korea’s equivalent of PBS. (He now chairs the documentary division of the D.C.-based Broadcast Education Association.) That background helped fuel his present field of research: the media manipulation of collective memory for political purposes.

Over the years, Han says, the facts of what occurred during the Japanese occupation of Korea have been replaced by “alternative facts” from political leaders who refuse to acknowledge events historians and others around the world confirm as true. This pattern repeats through different times and events; even during the 1980s, political turbulence erupted before Han’s eyes.

“In the ’80s there was a coup d’état,” he recalls, “and the coup d’état regime stayed there close to 10 years. I was attending school at the time, and when I was a sophomore in 1987, there were huge street rallies.” During each military regime change in his native country, “the first place they go is the presidential palace, then to the TV stations.”

He came to the U.S. from South Korea in 2003 and marks his 10th anniversary on the Hope faculty this year, which means he’s both a participant in the Korean diaspora, and a scholar of it. He was part of a team who presented a session on the Korean diaspora at the fall 2019 National Communications Association conference in Baltimore. While *diaspora* (which refers to any homogeneous group dispersed outside its homeland) is most frequently associated with Jews or Africans, Han notes that “because of their tumultuous recent history and geopolitical position, Koreans were either moved out of their territories or voluntarily went to other countries, and still do.” New sociocultural contexts may have enabled some to process and sift the mix of experience-based memory and stories crafted for political purposes that they carried with them.

In an offshoot of his research into collective memory, Han is creating his own South Korean version of TV Land — studying television sitcoms and dramas from the 1960s and 1970s.

“I was intrigued by British scholars who went to BBC archives and started watching shows from that era,” Han explains. “Why? Because there were the Beatles—there was new thinking, right? There were cultural movements. They tried to see those cultural changes, then political changes, through the lenses of television programs. I modeled my new exploration based on that model.”

However, the social and political landscape was very different for South Koreans in that era, Han says. “It was still kind of rubble in the ’60s, remnants of the [Korean] war,” he says. “America and Great Britain were stable countries; households had cars and jobs.

But Korea was poverty-ridden, and culturally and politically very homogenized, and also very authoritarian. So by going back and watching television shows from that time I think I can discover how far the country has come, and remind people how they were then, and how much they have learned or have lost over time. I think it’s going to be a very interesting investigation, because while they’re probably going to be kind of cheesy and corny, those stories are a witness to something.”

Some American universities have collections of vintage South Korean series, and there’s always YouTube. However, Han suspects that when he takes his family to South Korea this summer, he’ll be spending several hours a day staring at screens. “The nice thing about the national public broadcasting system is that they were required to keep those programs,” he says. “They became part of the national archives.”

Han will also read vintage newspaper articles to see how the shows were received and promoted in their day. “There were soap operas, but not American or Latin American style where there are intricate personal relationships between males and females,” he says. “Korean soap operas of the past meant small details of people living their lives. It was a country rooted in Confucianism, though it is changing now, but adultery or extramarital relationships were publicly demonized. So those stories were more likely a father admonishing his daughter for getting home late, or a docile wife going against her husband. It teaches us how they tried to stick to their old rules while trying to adapt and embrace the new.” 🍵

— By Jim McFarlin | Photo, Steven Herppich



To view the Korean Broadcasting System’s collection of videos visit [youtube.com/KBSArchive](https://www.youtube.com/KBSArchive)



# Identity Politics in Sub-Saharan Africa

VIRGINIA BEARD, PH.D. | ASSOCIATE PROFESSOR OF POLITICAL SCIENCE



Dr. Virginia Beard was into identity politics long before the issue showed up on America's front pages.

For more than a decade, she's investigated how religion, ethnicity and gender influence democratic attitudes and behaviors.

In two papers finished in 2019, she lays out how religious identity affects attitudes toward democracy in some countries in sub-Saharan Africa, and how ethnic identity plays out in elections in Kenya.

Religious identity significantly influences both a demand for democracy and the rejection of its alternative forms, she argues in one of those papers, which wrestles with two research findings that at first blush seem contradictory. The first is that Muslims in sub-Saharan Africa are slightly (but statistically significantly) more likely than the region's Christians to demand democracy. In documenting this point, Beard's research contributes to the global conversation about whether Islam is compatible with democracy.

"A lot of that research uses countries in the Middle East, but there's not much that looks at how Islam plays out in different parts of the world," Beard says. "In sub-Saharan Africa, in countries like Senegal — which has roughly 98 percent Islamic adherents — they are extremely democratic relative to other countries in sub-Saharan Africa. So, yes, Islam is as compatible as any other religion to democracy. It might look different, but context matters."

It's her second finding that, when set next to the first, provides the head-scratcher: Muslims are also more likely than Christians to be open to autocracy in the form of military rule.

To unknot this puzzle of seeming incompatibility — expressed preferences for both democratic governance and military autocracy — Beard scrutinized the historical experience and context of nations where this finding surfaces. In addition to her own research in Kenya and nearby East African nations, she drew on data made available by the Afrobarometer Survey Research Project, a non-partisan research institution that conducts public opinion surveys in 18 African nations on topics including democracy and governance. (Beard worked on the Afrobarometer as a graduate student.)

When she first explored this question while developing her 2006 doctoral dissertation, the Afrobarometer was tracking four countries that had significant Muslim populations: Senegal, Nigeria, Mali and Mozambique. In two of them, citizens had witnessed the military stepping in to restore order to an ill-functioning state, holding control temporarily, and then transitioning to some form of democratic elections. In those nations, the seemingly inconsistent

preferences persisted. In the other two, they did not.

If individuals' personal experience of their country's past demonstrated that military autocracy could lead to democratic governance, Beard notes, then it follows that people in that country might be sympathetic both to democracy *and* to military rule (provided that the latter is expected to be provisional).

"I reviewed the data to see if it holds over time that those 'inconsistent' preferences are found in people who live in countries where the military might have actually worked in favor of democracy," Beard says. "My argument is that it was their regime experience — how the military could coalesce with a type of democracy — that meant they would allow for it provisionally. It's not actually inconsistent preferences, but the experience of how the military worked in democracy."

The other paper Beard completed in 2019 examines the role of ethnicity in Kenyan elections. She compared quantitative Afrobarometer data to what the Kenyan media reflects about identity politics.

Of Kenya's 42 ethnic groups, just a small handful — Kikuyu, Luhya, Luo, Kalenjin and Kamba — are politically relevant, with allegiances and alignments that shift from election to election in a particularly Kenyan iteration of the universally relentless struggle for political power, Beard says — and to keep that power they "pull the ethnic lever to keep the masses supporting one side or the other."

Afrobarometer data gets at whether a respondent identifies primarily with a nationality, or with an ethnic group. For example, one question asks whether a respondent feels only Kenyan; more Kenyan than, for example, Kikuyu; equally Kenyan and Kikuyu; more Kikuyu than Kenyan; or only Kikuyu.

"A lot of these show a waxing and waning of people feeling more Kenyan," Beard says. For a time, it became increasingly common for people to identify as Kenyan first, and less intensely with their ethnic group. That recently shifted, she reports; now, more Kenyans put the two on equal footing, or identify most deeply with their ethnic group.

As Beard analyzes Kenyan media coverage, she includes opinion pieces and letters to the editor, which she suspects may express people's perceptions more accurately than journalists' articles and reports do. Many of the letters and op-ed pieces include statements that reveal the persistent importance of ethnic identity: as Beard sums it up, "In my gut I'm both Kenyan and Kikuyu. But the one that gets me a job or gets me arrested? That's my ethnicity."

Beard's been amassing media samples and qualitative information since 2014, when she spent two months in Kenya and had access to print newspapers. Back at Hope, she and a student entered her findings into a data set, and she resumed the analysis she'd begun in Kenya. She continues to add and analyze articles obtained from online editions of the newspaper.



She took advantage of an unrelated Great Lakes Colleges Association faculty study tour to Kenya in summer 2019 to gather additional information. "I get a better sense of things when I'm on the ground," she says, "especially with things that don't make international news but are reported on local Kenyan television or in print editions of the newspapers." 🌿

— *By Josh Bishop* |

*Photo, Steven Herppich*



# Can You Feel the Forró Beat?

CHRISTOPHER FASHUN, DMA | ASSISTANT PROFESSOR OF MUSIC



The rhythms of Afro-Brazilian music still echo the ancient drumbeats of Africa — carried across oceans on slave ships, adapted across the centuries, and today encompassing both a distinctive cultural identity and a communal national bond.

Christopher Fashun (*at right in photo*) spent four months of 2019 in Brazil as a Fulbright Scholar, researching the dissemination of Afro-Brazilian music and culture in the coastal city of Salvador da Bahia and throughout Brazil.

“Salvador is widely acknowledged as the Afro-Brazilian capital of Brazil,” Fashun says. In Salvador, one of the largest cities in Brazil, around 80 percent of the population identifies as either black or of multi-ethnic ancestry.

From May through August 2019, Fashun, who directs the Hope College Brazilian Music Ensemble, immersed himself in Salvador’s Afro-Brazilian music and culture. He performed at an international percussion festival; worked with Jorge Sacramento, professor of percussion at the Universidade

Federal da Bahia (Federal University of Bahia); and studied with Mestre Mario Pam, the music director of Ilê Aiyé, the oldest *Afro bloco*, or Afro-Brazilian *carnaval* block (as Brazilians call community centers).

“My Fulbright research resulted in a synthesis from opposite perspectives — academic through the lens of the university and then, with my colleague Mario, through the eyes of the Afro-Brazilian experience,” Fashun says. “I started to ask, *How do the Brazilians share this musical culture?* Because they share it not just within a city or a state, but throughout the nation. There are certain genres of music that are shared nationwide.”

“These Afro-Brazilian rhythms, which originate from the Afro-Brazilian religion *candomblé*, have made their way into popular music. Even if you’re not from Salvador or the northeast, where these rhythms are more prevalent, people everywhere know it.”

One thing that is readily apparent — and markedly different from the United States — is that public school students receive no formal musical education. In the United States, most elementary school students spend at least a little time each week with a recorder or a triangle, but in Brazil, musical education (which is to say, the passing on of a musical tradition from one generation to the next) takes place entirely outside of the school setting.

So how do they do it? How do music and dance genres as culturally significant as *samba* and *choro* get passed along through particular cultures (like Salvador’s Afro-Brazilian culture) and into the national consciousness?

Fashun attributes it to two main elements: festivals and social programs.

Carnaval, of course, is the biggest Brazilian festival, the one everyone thinks of — but music is also a big part of smaller festivals throughout the year. Fashun was in Salvador for Festa Junina, a month of celebration rooted in church festivals of the Portuguese colonial era, celebrations of Santo Antônio (St. Anthony), São Pedro (St. Peter) and the nativity of São João (John the Baptist). During June, people gather together in a series of small parties that can have the feel of a family reunion; in rural areas it's common for people to return to the places they grew up.

“It's this celebration of three Catholic saints, but it's also rolled into this other form of music called *forró*, which is really popular. You hear it everywhere. You hear the music in shopping malls, in restaurants, on the radio,” he says. “These little kids hear the songs for the whole month of June and probably even throughout the year, because it's just such a popular form of music.”

In addition to festivals, “music is perpetuated through what they call ‘social projects,’” Fashun says, which are government-approved cultural programs. The entire Fashun family participated in them during their stay in Salvador. “I studied drumming, my wife and I studied Afro-Brazilian dance with a teacher, and then my daughter and I did *capoeira*, which is a martial art developed by slaves.”

Fashun was invited to observe a social project called NEOJIBA (an acronym derived from its full name,

Núcleos Estaduais de Orquestras Juvenis e Infantis da Bahia — in English, Nuclei of Youth and Children's Orchestras of the State of Bahia). This method of teaching music to children is based on the Venezuelan El Sistema model for teaching classical music, and operates through music centers funded by the Brazilian government and private organizations. In addition to classical music, though, NEOJIBA teaches children how to play traditional and popular Brazilian music — and, especially in Salvador, Afro-Brazilian music.

Experiencing firsthand these cultural festivals and government-approved cultural education programs reinforced for Fashun the importance of expanding music education beyond the classroom and into communities, which is something he already was putting into action: Hope's Brazilian Drumming Ensemble performs for educational assemblies and other events throughout Michigan. And he points out that the U.S. has its own version of Brazil's government-sponsored “social project”: independent American nonprofit organizations and cultural centers that work to pass on traditional forms of music intergenerationally.

“In Salvador,” Fashun says, “they're hitting it from all different angles — culturally and through their familial connections — to celebrate these things that continue to unite them as a people.” 🌿  
— By Josh Bishop | Photos, Christopher Fashun

*Experience Afro-Brazilian choro music at*  
**[spera.hope.edu/fashun-music](https://spera.hope.edu/fashun-music)**





## LINKING RESEARCHERS WITH THE DIGITAL LIBERAL ARTS

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VICTORIA LONGFIELD, M.S.  
ASSISTANT PROFESSOR AND DIGITAL LIBERAL ARTS LIBRARIAN



As digital resources continue to change the face of research and teaching, Victoria Longfield helps Hope College faculty and students explore how cutting-edge tools can help them broaden and exceed their goals.

Her job title as Van Wylen Library's digital liberal arts librarian is unusual even in this high-tech era. Hope is among just three American liberal arts colleges (with Grinnell and Middlebury) that dedicate staff or programs to growing the use of digital tools across all academic fields. Other schools' "digital humanities" target just the subjects under that umbrella, fields such as history, philosophy, religion and literature.

"Softwares are developed, typically, for very particular niche subject areas," Longfield notes. At Hope, professors in diverse fields are "taking those tools and finding new meanings for them in different places. An English professor might have a thousand texts on a given theme; how can we quickly analyze and disseminate that? Or another professor may want to take many events in time and display them in a way that conveys how they relate."

There's no need to explain that software does things quickly that might take a lifetime with paper and pen. What's often less obvious, even to scholars, is where to begin. As faculty consult with Longfield to explore software options, digital scholarship methodologies or code for a research project, they may re-envision the process and what they'll produce. TimelineJS, NVivo and Atlas.ti — to cherry-pick a few of the products available to Hope faculty and students — allow users to embed sophisticated content in a website, online timeline or other easily accessible platforms and create engaging presentations that can reach broad audiences around the world but just a keystroke away. Hope professors are using them to archive research, create podcasts of interviews, and build digital maps that correlate a topic with events and social movements that form its context.

## SUPPORTING RESEARCH IN THE FINE ARTS

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JESSICA HRONCHEK, M.A., MLS | ASSOCIATE PROFESSOR  
AND RESEARCH AND INSTRUCTION LIBRARIAN



The upcoming production was Dance 43, Hope College's annual faculty recital. Forty-seven student dancers were rehearsing with seven faculty and guest choreographers, and Jessica Hronchek was the fly on the wall.

Hronchek spent weeks shadowing the dance company and interviewing choreographers to learn more about how people share information in a creative context — and how, as Van Wylen Library's liaison to Hope College's fine arts faculty, she can best support their work and understand their "information ecosystem." She also shadowed the director, cast and crew of Hope's production of *Love and Information*, Caryl Churchill's play about communication in the digital age.

Research is a different ballgame when it builds toward non-text-based creative products. "Some faculty use textual and interdisciplinary resources extensively in their research and some use less. There's often serendipity within the methods. A choreographer looking for inspiration for a new piece — that's an iterative process of text-based research, and work in the studio, and creative exploration of their own, interwoven," Hronchek says.

In consultation with faculty, Hronchek has expanded Van Wylen Library's resources in the arts; recent acquisitions include Ontheboards.tv (a collection of contemporary dance and performance art) and the International Bibliography of Theater and Dance database. She helps faculty identify and leverage resources for campus creative events; for a 2018 theater production, for instance, she tracked down scores of 19th-century Russian folk songs so they could be integrated into the performance. To complement an exhibition in De Pree Gallery, Hronchek organized an exhibit in the library that drew on Van Wylen's rare books collection, other print holdings and digital media.

"A certain nimbleness has to be there," she says. "We need to go an extra mile to see that colleagues in any disciplinary area are truly heard and listened to — that library systems, processes and research methods support diverse approaches."



### ***Deification in the Latin Patristic Tradition***

(Catholic University of America Press)

Dr. Jared Ortiz (religion) edited this volume of essays about the doctrine of deification in the early Christian centuries. Deification is a vision of salvation which claims that believers can become “partakers of the divine nature” (2 Peter 1:4) through union with Christ. Ortiz retrieves this doctrine which was thought not to be present in the Latin-speaking church. The essays cover the great figures of the early church, including Ambrose, Augustine and Jerome.

Meet Dr. Ortiz at [spera.hope.edu/ortiz-human](https://spera.hope.edu/ortiz-human)

### ***Rostros*** (Evia Learning)

This innovative second-year Spanish text is based on cultural content that engages students in reading and discussion about cultures in which Spanish is spoken. Lead author Dr. Daniel Woolsey (Spanish) collaborated on the multi-media portfolio with Dr. Lee Forester (German) for Evia Learning, a company that publishes language learning materials that build students’ cultural competency along with communication skills, so they can connect meaningfully with speakers of another language for the rest of their lives.

Hear Dr. Woolsey describe *Rostros*’ cultural focus at [evialearning.com/rostros-2](https://evialearning.com/rostros-2)

### ***Responsive Becoming: Moral Formation in Theological, Evolutionary, and Developmental Perspective*** (T&T Clark)

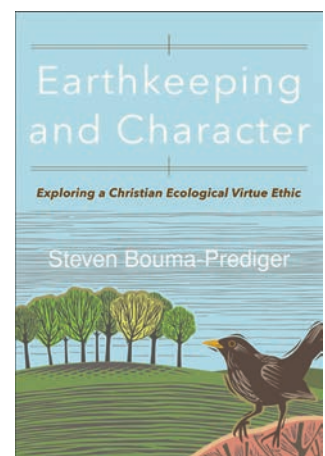
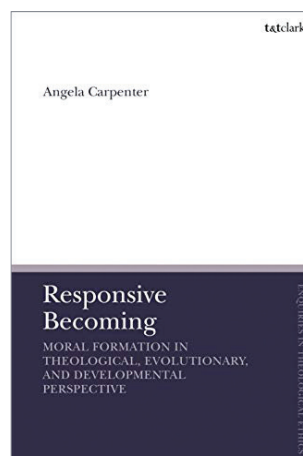
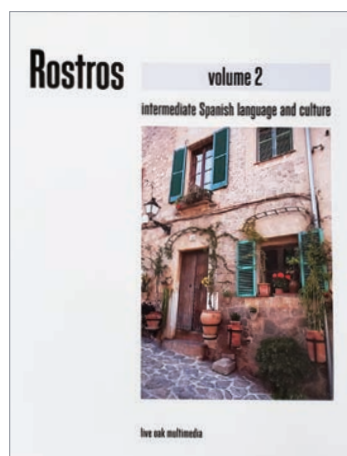
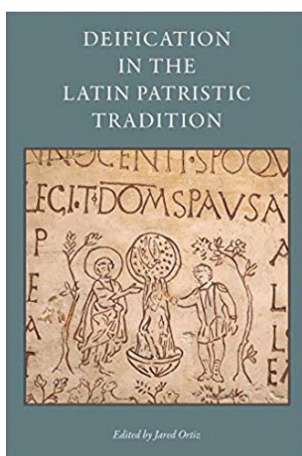
In this examination of the doctrine of sanctification, Dr. Angela Carpenter (religion) draws on evolutionary anthropology, developmental psychology and Christian theology as she considers how moral formation takes shape. Can human moral goodness, she asks, be received as a gift of God’s grace? To learn more, turn to page 18.

### ***Earthkeeping and Character*** (Baker Academic)

Building on his book *For the Beauty of the Earth*, Dr. Steven Bouma-Prediger (religion) presents care for creation — earthkeeping — as an integral part of what it means to be a Christian. Exploring the virtues and character traits bound up in that task, he encourages readers to reconsider how they think about the natural world and their place in it.

### ***Honoring God with Body and Mind: Sexual Ethics for Christians*** (Cascade)

Informed by decades of conversations with students about sensitive topics about sex, Dr. Steven Hoogerwerf (religion) takes a conversational approach to examining questions on young Christians’ minds. He invites readers into a life-long process of Christian ethical reflection.



### ***Hindi Christian Literature in Contemporary India*** (Routledge)

From case studies, Dr. Rakesh Peter-Dass (religion) develops insights about links between language, religion and politics, and documents how literature of Hindi-speaking North India presents Christianity as linguistically Hindi, culturally Indian and theologically informed by other religions.

### ***Saint Peter and the Goldfinch*** (Wayne State University Press)

Imaginative, intimate meditations on everyday life, love and aging by retired Hope English professor Jack Ridl, a prolific poet. Former U.S. Poet Laureate Billy Collins says the book “delights and surprises us poem by poem.”

### ***Surreal Expulsion*** (The Poetry Box)

In the wake of yet another mass school shooting, David James (English) penned this chapbook of poems that respond to violence, injustice and what James calls “political negligence” worldwide.

### **SECOND GLOBAL CONGRESS ON SPORT AND CHRISTIANITY**

October 2019 at Calvin University

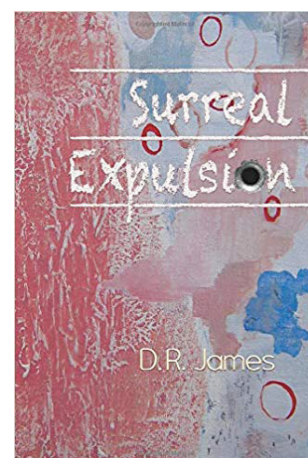
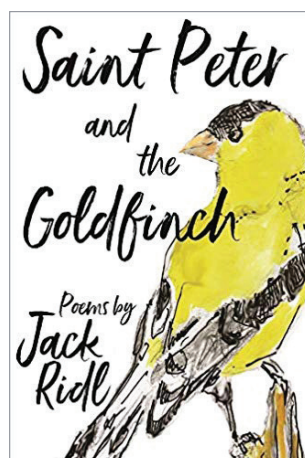
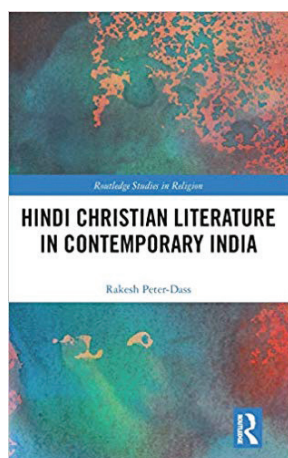
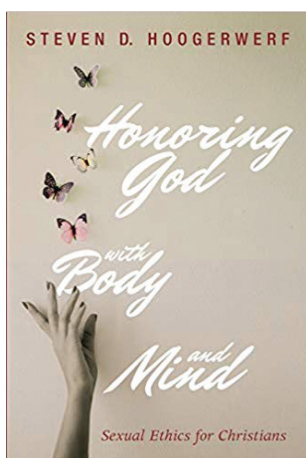
Yale theologian Dr. Miroslav Volf, Hope historian Dr. Fred Johnson, Special Olympian Loretta Claiborne and pro athlete Tim Tebow were among the keynote speakers at this conference co-sponsored by Hope College and Calvin University. Hope’s Dr. Chad Carlson (kinesiology) and Calvin’s Dean of Education (and professor of kinesiology) Dr. Brian Bolt were the co-directors. Over five days, 240 participants from 20 nations explored the mutual impact of belief and sport, and sport’s impact on faith and culture.

*Listen at [spera.hope.edu/carlson-bolt-podcast](https://spera.hope.edu/carlson-bolt-podcast) to Carlson and Bolt’s podcast Dig Deep: Sport, Faith, Life*

### **UNITING MIND AND BODY: COGNITION, EMBODIMENT AND LITURGY** Society of Christian Philosophers Central Regional Conference September 2019 at Hope College

Hope philosophy faculty organized this forum for presentations by scholars affiliated with 29 colleges and universities. Speakers explored the relationship between mind and body, the ways we experience embodiment, cognitive science, and wide-ranging related topics including time loops, brain death and skeptical theism. Hope faculty members Dr. Joseph LaPorte, Dr. Greg Bassett, Dr. Jack Mulder, Dr. Kate Finley, Dr. Kevin Kambo and professor and dean Dr. Sandra Visser chaired six of the conference sessions.

*Peruse the speakers’ abstracts at [spera.hope.edu/philosophy-abstracts](https://spera.hope.edu/philosophy-abstracts)*





## BRINGING AMERICAN PERSPECTIVE TO EASTERN EUROPE, AND VICE VERSA

THOMAS SMITH, PH.D. | DR. LEON A. BOSCH '29 PROFESSOR OF MANAGEMENT

In 2013, Dr. Thomas Smith took a leave from Hope to spend a year at Emanuel University in Romania. Originally an underground college for pastors, it became a Christian university after the Soviet Union dissolved. Some students he taught there still seek his counsel as they grapple with how to live out Christian ethics in a business community that plays by different rules. In 2019, he visited Lithuania and Moldova to scout out opportunities for Hope students to experience life and the business world in the former Soviet bloc.

“ In Romania, if you want to get your business to the next level, you have to play the game, and that often means bribes. Young men and women from Emanuel going into business rise quickly and they very quickly run into a dilemma. If they say no to bribes, the company could go down, but if they say yes to keep the business going, they sacrifice their principles. That’s not something you and I in the United States have to deal with. It’s easy for me to say, ‘Well, of course don’t pay the bribe’ — but there’s way more to that decision than the simple black and white.

Our students need to experience something beyond a traditional semester at Hope College. We’re trying to find places that have a particular type of community where students can be exposed to and understand how all the dimensions of a community work. Some of these opportunities need to be in Eastern Europe, because that particular location and the nature of programs there will transform their lives. ”







## ON THE COVER

A violin's strings and fingerboard, key to the baroque . . . and bluegrass. Professor Mihai Craioveanu invites uncommon combinations of musicians to Hope College to collaborate in concerts that span genres and musical cultures.

Read more . . . page 23


*Browse the Hope College fine arts events calendar at*  
**hope.edu/arts**

## IN THIS ISSUE






Learn about more than two dozen Hope faculty members' writing, research, artistic endeavors, and impact beyond the campus.

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