

SPRING 2018

Catching FIRE

THE OFFICIAL NEWSLETTER OF THE NYU TANDON DEPARTMENT OF FINANCE AND RISK ENGINEERING





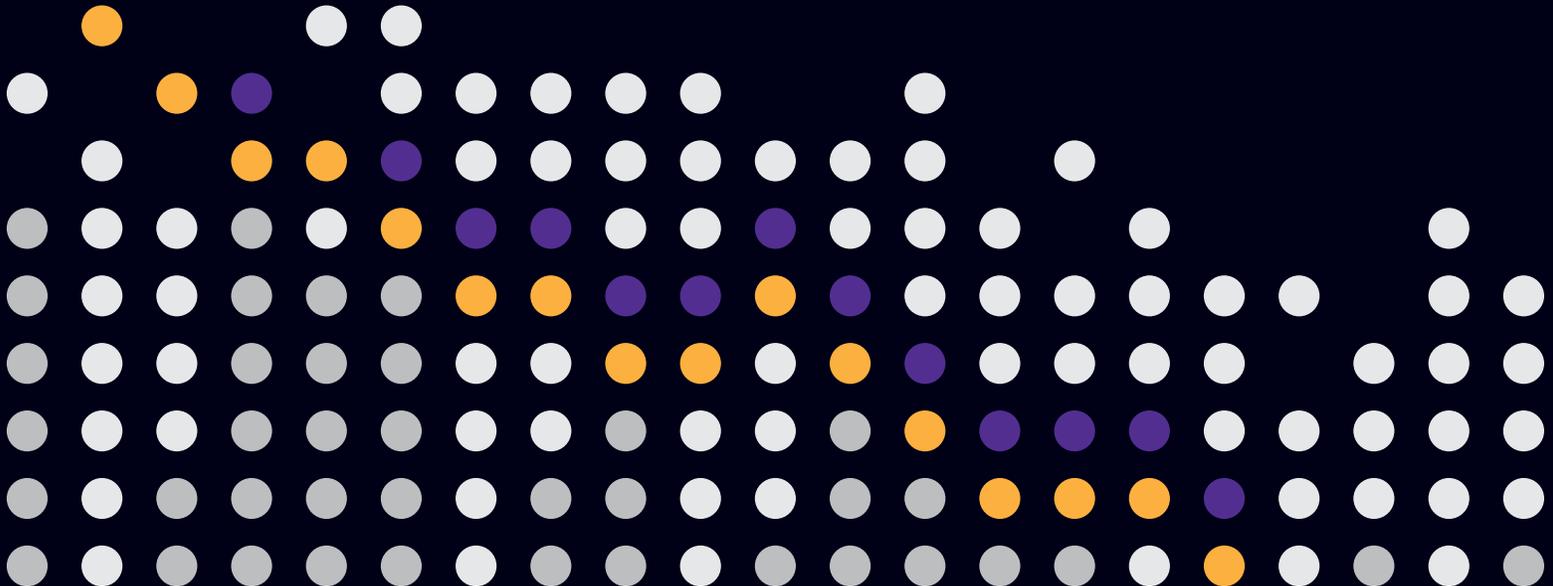
“The recent highly impressive advances in machine learning (ML) are fraught with both promise and peril when applied to modern finance.”

Last fall brought several welcome developments to the Department of Finance and Risk Engineering – along with 163 newly enrolled graduate students. (They comprised the first FRE cohort that had completed an intensive online summer course in advance of their arrival at the MetroTech Center, making for an exceptionally eager and prepared group).

Department Chair **Peter Carr** hired several outstanding financial practitioners as adjunct professors (see page 7) and revamped the curriculum to include new courses that will enable students to stay on the leading edge and prepare them for jobs in the rapidly evolving financial industry. Students can now, for example, take a course that focuses on blockchain technology and the consensus protocols behind Bitcoin and the other cryptocurrencies making headlines on a regular basis. Machine learning also features broadly into the new curriculum, with several of the new instructors acknowledged as leaders in the field and course offerings suitable even for those students with no prior programming experience. (See the next page for a look at how machine learning is changing the way the industry functions and how NYU Tandon is tackling those changes.)

In addition to his academic responsibilities, Carr (along with Assistant Professor Andrew Papanicolaou) served as a co-organizer of the Second Annual Eastern Conference on Mathematical Finance. The three-day event took place in New York City in November 2017 and attracted a stellar lineup of speakers from industry and academia, who addressed such issues as cost efficiency in incomplete markets and optimal microstructure trading with a long-term utility function.

Carr, a former Quant of the Year, is himself in great demand as a speaker at conferences around the globe. In December 2017 he presented lectures on implied volatility at Stanford University’s Applied Math Department and at the Institute of Pure and Applied Math (IPAM) Conference, and he has also recently spoken of the parallels between modeling bond yields and implied volatilities to audiences at Barclays, Credit Swiss, and Royal Bank of Canada. He also gave an overview of Fixed Income Modeling to Bank of China in New York last November. In May 2018 he is scheduled to speak in Lisbon, Portugal, at the QuantMinds International Conference, widely considered to be the most prestigious event in the world of quant finance. In June, he is giving a three-day seminar on volatility trading at the annual Risk Management and Trading Conference in Mexico City.



MACHINE LEARNING

in FRE

Machine Learning has been steadily changing the nature of the financial industry in fundamental ways in recent years, with companies now using algorithms to calibrate personal portfolios, make loan decisions, detect fraud, do the job of insurance underwriters, and conduct high-frequency trades.

FRE is keeping pace with those dizzying changes, with new courses, new instructors, and an entire program track devoted to Technology and Algorithmic Finance. Students on that track begin their studies with a course in the foundations of financial technology and then choose from a wide array of classes, including forensics and regulatory systems, big data, statistical arbitrage, algorithmic portfolio management, behavioral finance (which examines what happens when there is a mismatch between investor behavior and the algorithmic assumptions about investment behavior inherent in financial theory), and more.

By the time they graduate, students have developed impressive software projects, become proficient in common trading strategies and how to implement and back-test them, and learned to create new models and build innovative and useful tools quickly.

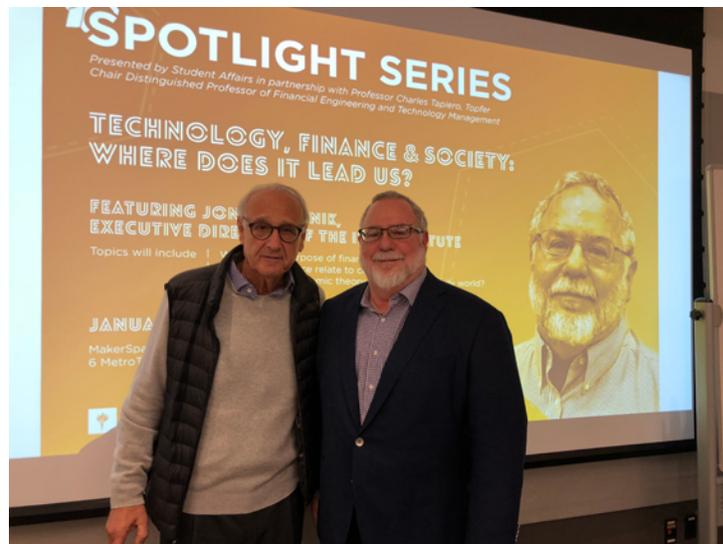
“We are seeing an unprecedented rate of technology-driven innovation in the financial industry,” Department Chair Peter Carr explains. “As software capabilities and raw computing power have expanded, new methods of harnessing the power of machine learning are emerging, and our goal as a department is to enable students to be at the forefront of developing those methods for the benefit of their companies and clients.”



Corporate Governance in the Spotlight

With the help of Topfer Chair Distinguished Professor Charles Tapiero, Associate Dean of Student Affairs Anita Farrington organized the Spotlight Series event “Technology, Finance and Society: Where Does It Lead Us?” featuring Jon Lukomnik, the executive director of the Investor Responsibility Research Center (IRRC) Institute, who addressed such thought-provoking topics as the relationship between finance and climate change and how an academic theory from 1952 still affects the daily world.

Deemed one of the pioneers of modern corporate governance by Forbes magazine, Lukomnik’s CV includes stints as an investment advisor to the New York City pension funds, chair of the executive committee of the Council of Institutional Investors, and co-founder and governor of the International Corporate Governance Network. “It was an honor to host a person so esteemed in his field,” Farrington said. “He provided our FRE students with a look at issues that they might not consider in their particular academic major, opening their minds and preparing them to be responsible, thinking members of the finance community.”



Toughing It Out in ARPM Boot Camp

This year, FRE is continuing its partnership with ARPM to offer an intensive six-day Advanced Risk and Portfolio Management Boot Camp, which will be held from August 13 - 18, 2018. Offered at no cost to FRE students, the course, which can be undertaken as a capstone project, consolidates portfolio and risk managers’ expertise into a structured and rigorous quantitative framework and will include 50 hours of instruction in such topics as data science and machine learning; classical/Bayesian multivariate statistics and econometrics; financial analytics, market, credit and liquidity risk

management; estimation error and model risk; factor modeling, alpha-beta signals, portfolio construction and optimization; algorithmic trading, systematic strategies, portfolio insurance, drawdown control; optimal trade execution; and more. In addition to lectures and practice sessions, the course includes ample opportunities to network with fellow students and industry professionals.

On the Job Hunt

On October 9, 2017, more than 100 FRE students attended a Mock Interview Workshop moderated by NYU Adjunct Professor and former Head of Front Office Risk at BNP Paribas Thomas Phillips. Featured guests included NYU Adjunct Professor and former Managing Director of Highbridge Capital Jerome Benevise, and alums Nikhil Gautam Chaudhari of J.P. Morgan, Yuansheng Li of China's Bank of Communications, and Yaoxi Douglas Li of Goldman Sachs. The event kicked off with an "interviewing best practices" advice panel before students got a chance to sit in the hot seat for a mock interview that gave them the real-life scoop on how financial industry interviews are conducted.

The following month, FRE students got the opportunity to attend a recruiting advice panel featuring Vibhati Joshi, who was graduating in December 2017 and joining American Express; Qijia Lou, who will be joining MKP after graduating in May 2018; Xingyue Huang, a December 2017 grad who went on to JP Morgan, and Mengzhou Jojo Tang, a May 2018 grad planning to join Jeffries. The panel covered a range of topics, including the importance of networking, determining a career focus, preparing for interviews, and increasing the chances of receiving a full-time offer of employment after an internship.



Women Helping Women

On February 26, 2018, female financial engineering graduate students were joined by accomplished women working in the field of quantitative finance for a panel discussion and networking event at NYU Tandon. The panel – which was moderated by Edith Mandel, NYU Tandon Adjunct Professor and founder of Greenwich Street Advisors – featured Ioana Boier of Citadel LLC, Sara Strang of Alphadyne, and Ingrid Tierens of Goldman Sachs. The discussion topics included work-life balance, transitioning between buy-side and sell-side jobs, and how best to prepare for interviews. With increasing numbers of women enrolling at Tandon each year, the empowering event was a timely and important one for all who participated.

Mandel – who has a lengthy history of leadership in the Fixed Income arms of Goldman Sachs, Citadel and KCG and extensive experience in developing rates trading models and building new systematic trading businesses from the ground up – is especially cognizant of the changing dynamics in her industry. "While there still aren't enough women in the field, it's much better than it was 20 years ago, when I started, and as the industry becomes more process- and data-driven, the old-boys' atmosphere is becoming increasingly less prevalent," she has said. "Now what matters most is simply who is doing the better job, no matter what their gender."



At the Podium

Our department is proud to host an extensive lecture series with invited speakers from around the world. The series launched in January with a look at how a team of Tandon students took home the top prize in the high-stakes University Trading Challenge. February's lectures were given by Luca Capriotti of

University College London, Antoine Jack Jacquier of Imperial College London, and Alex Feser of Switzerland's University of St. Gallen, and subsequent guest speakers included Founder and CEO of Stronghold Labs Alexander Lipton, CEO of Decision Science Brian Healy, and Gregory Pelts of Wells Fargo. The series will culminate in May, with a presentation on portfolio theory in terms of partial covariance by Alec Schmidt, a lead research scientist at Kensho Technologies.

FACULTY HIGHLIGHTS

It has been a busy period for **Charles Tapiero**, Department Founder and the Topfer Distinguished Professor of Financial Engineering and Technology Management. His new textbook, *Globalization, Gating, and Risk Finance*, in which he and his co-author, Unurjargal Nyambuu, offer fresh perspectives on global risk finance in a world with economies in transition, was published by Wiley in January; April saw a set of previous books – Managerial Planning: *An Optimum and Stochastic Approach* Volumes 1 and 2 – issued in new editions.

Additionally, several of his papers have appeared recently in peer-reviewed journals, including: “Fractional Randomness and the Brownian Bridge” (*Physica A*), “Data Science and Intelligence” (*Risk and Decision Analysis*), “Implied Fractional Hazard Rates and Default Risk Distributions” (*Probability, Uncertainty, and Quantitative Risk*), and *Fractional Randomness* (*Physica A*).

Always in demand as a guest speaker, the past year has found him in Italy, Israel, and Hong Kong, among other locales, and he recently addressed the Society of Quantitative Analysts (SQA), right here in New York City.

On February 21, Adjunct Professor **Roy Freedman** was celebrated at the Faculty Honors Reception hosted by NYU President Andrew Hamilton and Provost Katherine E. Fleming, in recognition of his election to the Computational Finance and Economics Technical Committee of the IEEE Computational Intelligence Society.

In February Research Professor **Igor Halperin** gave a spirited presentation to an audience of 250 top engineers and analysts at Moody’s Investors Service. Part of Moody’s annual celebration of National Engineers Week, the presentation,

“Machine Learning in Finance,” offered a broad historical perspective on advances in machine learning and a review of its applications in the financial field. Halperin also spoke about his latest research on the applications of Reinforcement Learning to option pricing, which suggests that Reinforcement Learning can replace – and might even be more useful than – several existing models of continuous-time Mathematical Finance.

Assistant Professor **Andrew Papanicolaou** recently co-authored a paper published in the highly regarded *Journal of Investment Strategies* that offers insight into effective short-volatility strategies. In it, he and his colleague, NYU Professor of Mathematics Marco Avellaneda, examine the market for exchange-traded volatility and posit that the key to understanding spikes in U.S. equity volatility can be found by looking beyond the VIX index (sometimes colorfully called the “fear index”) to the broader picture.

Distinguished Professor **Nassim Nicholas Taleb’s** fifth book, *Skin in the Game: Hidden Asymmetries in Daily Life*, was recently published by Penguin Random House.

In addition to the book, Taleb – who has lectured in London, Brussels, Louvain, Tbilisi, Moscow and Miami this past year – has also recently written or co-written multiple scholarly journal articles, including “Election Predictions as Martingales: An Arbitrage Approach” (*Quantitative Finance*) and “Gini Estimation under Infinite Variance.” (*Physica A*). He also recently gave a plenary lecture at JPL-NASA in Pasadena, CA.



Charles Tapiero



Roy Freedman



Igor Halperin



Andrew Papanicolaou



Nassim Nicholas Taleb



Maggie Copeland
Bear Stearns

Look at **Tom and Maggie Copeland's** CVs, and you are likely to be staggeringly impressed. The co-founders of an eponymous trading group, they have decades of collective experience to their credit.

The first woman ever to earn a doctoral degree in finance from UCLA, Maggie Copeland has published her research in such periodicals as the Financial Analyst Journal, the Journal of Portfolio Management, and Financial Management and has worked as a risk manager at Fidelity Investments, a senior portfolio manager and hedge fund manager at Citigroup, the vice president of proprietary trading at NatWest Securities, a proprietary trader at Bear Stearns, and a partner and portfolio manager at Roll and Ross, to list just some of the entries on her resume.



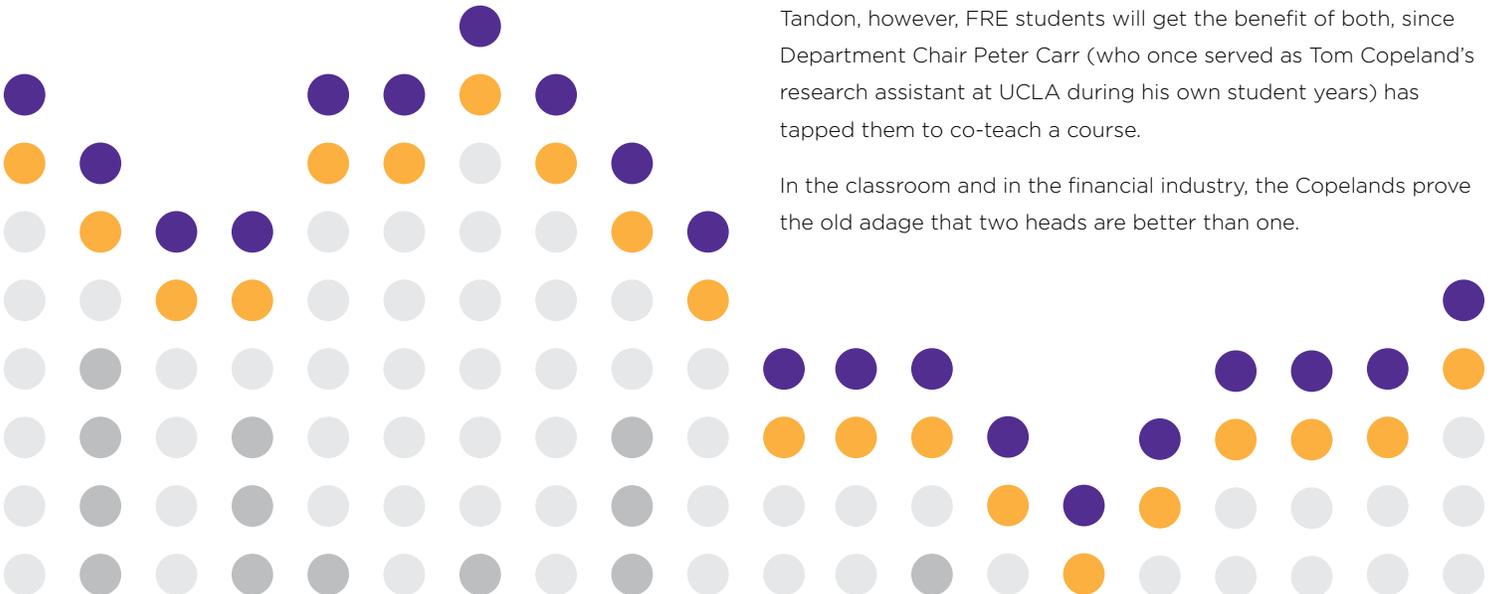
Tom Copeland
McKinsey

Tom Copeland has been teaching since the early 1970s at such institutions as UCLA, MIT, and Harvard and is the author of Finance Theory and Corporate Policy, a graduate-level textbook that has been in print for almost four decades, as well as six other highly regarded books and dozens of articles that have garnered more than 24,000 citations in the Google author index.

In addition to making his mark in academia and in print, he served for several years as a partner and co-leader of the corporate finance practice at McKinsey & Co., and when journalist Duff McDonald wrote about the iconic company in his 2013 book, The Firm, he referred to Copeland as the "valuation guru." (Maggie Copeland has joked that her role in their work partnership is to "computerize the guru's brain.") And that's all before mentioning that he has appeared twice as an expert witness before the World Court, testifying on corporate valuation.

They each possesses a fierce intellect and deep understanding of the financial industry, and students would undoubtedly count themselves lucky to be taught by either one. At NYU Tandon, however, FRE students will get the benefit of both, since Department Chair Peter Carr (who once served as Tom Copeland's research assistant at UCLA during his own student years) has tapped them to co-teach a course.

In the classroom and in the financial industry, the Copelands prove the old adage that two heads are better than one.





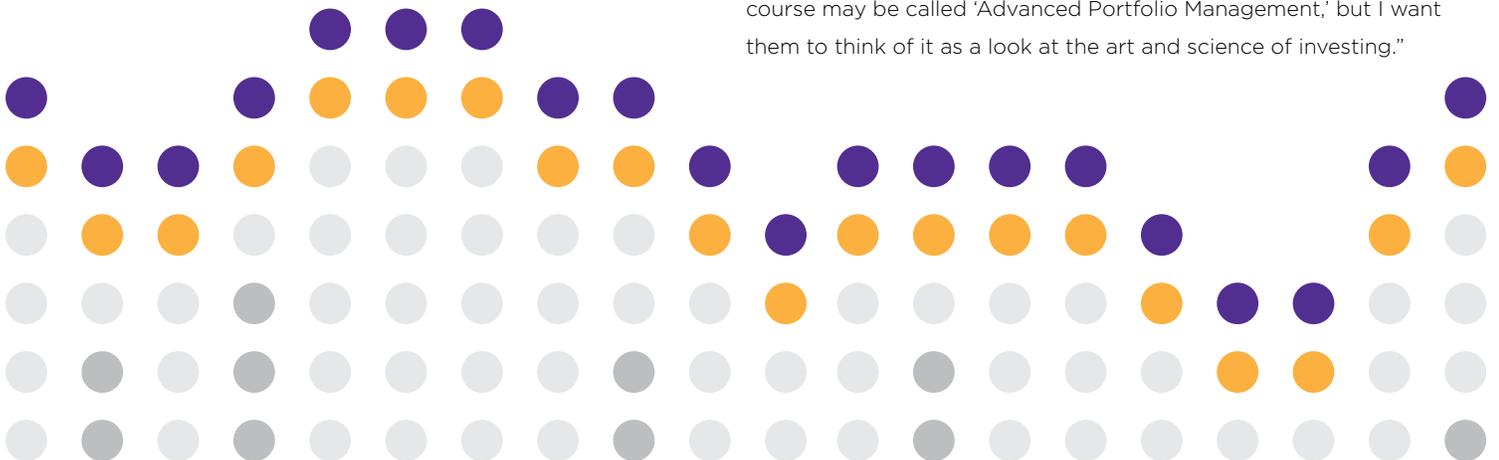
Vikram Kuriyan
Global Wealth Allocation Ltd.

In his capacities as chairman of Global Wealth Allocation (GWA) Ltd., the founder and director of the Indian School of Business's Investment Laboratory, and trustee of the nonprofit CFA Institute Research Foundation, **Vikram Kuriyan** very literally circles the globe multiple times a year. It's a set of circumstances that has shaped his outlook on the financial industry – and on life itself. "As the pace of globalization accelerates, the world shrinks," he says. "Talent and human capital are more vital to a company's success than geographic location."

Educated at MIT and Harvard, Kuriyan has a background as varied and wide-ranging as his travels. "I was exposed as a student to soft management skills, but I was more interested in hard, math-oriented finance," he recalls. "A successful financial professional needs a good combination: a solid understanding of the mathematical theory along with a healthy skepticism about models, which are useful but have undeniable weaknesses."

Kuriyan spent several years of his career at Bank of America's asset management division, where as global head of quantitative strategies and chairman of the asset allocation committee, he saw every side of the industry, from equities to fixed income securities to hedge funds, and more. "It was a wonderful experience, because I was engaged in a virtuous cycle in which client interests and business incentives were nicely aligned."

He sees teaching not just as a way of giving back to the industry that has helped him forge such a rewarding life but as a method of keeping himself sharp and improving his own thought processes. "When working in industry, I deal every day with very fine minds," he says. "Being with students exposes me to fresh minds, and that's a valuable thing in its own right." He hopes that he can be an even better instructor than the admittedly brilliant figures he studied with in his own youth – one of whom was the Nobel Prize-winning economist Robert C. Merton. "In addition to having studied the academic theories underpinning the financial industry, I have the advantage of many years of real-world experience, so I think the students will benefit from that broad perspective," he says. "The course may be called 'Advanced Portfolio Management,' but I want them to think of it as a look at the art and science of investing."





Kevin Atteson
Summer Road



Ken Zhang
Morgan Stanley



Kosrow Dehnad
Concord Advice



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Igor Halperin
Research Professor NYU



Monty Essid
NYU Courant



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Tore Opsahi
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BNP Paribas



Gordon Ritter
GSA Capital



Louis Scott
Federal Reserve
Bank NY



Sanjay Sharma
GreenPoint



Zhibai Zhang
Strat 11



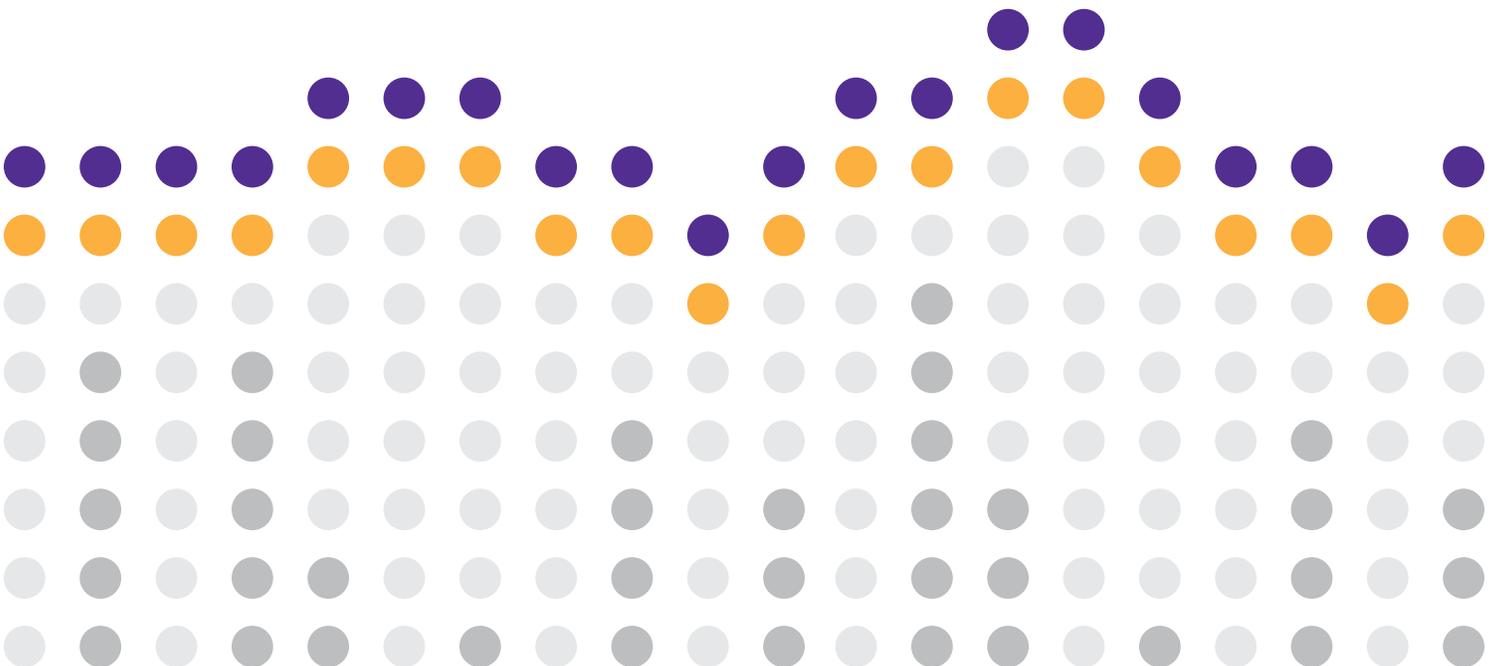
Jerome Benveniste
ex Highbridge
Capital Management

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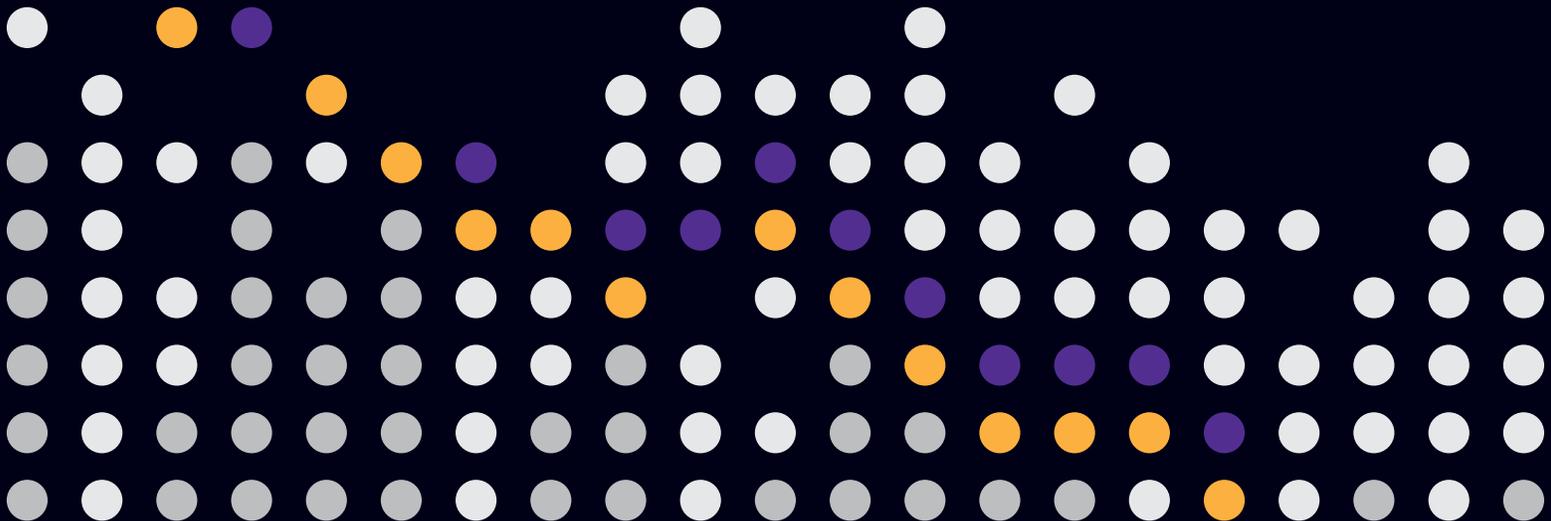
SPOTLIGHT ON ALUMNI



Russell McManus began his career in finance as a software developer at J.P. Morgan Chase and later joined the equities technology division at Goldman Sachs, which motivated him to enroll in the master's degree program in Financial Engineering at what was then known as Polytechnic University. Frederick Novometsky, the former director of the program, referred him to Morgan Stanley, where he landed his dream job, helping to launch the company's automated market-making desk trading listed equity options in the U.S. and Europe. "Looking back, I was very lucky to be in the right place at the right time, but as they say, sometimes it's better to be lucky than good," admits Russ. He has spent the last eight years as the Chief Technology Officer at Chicago Trading Company, one of the country's most prominent options market-making firms, helping build its electronic trading platform into a competitive advantage.



After earning his degree in Financial Engineering in May 2016, **Daoxing (Andy) Wang** joined Susquehanna International Group, LLP (SIG) in Bala Cynwyd, Pennsylvania, as a Strategist for the Fixed Income Desk. There he assists the technology team in the generation and back-testing of trading strategies using a variety of C++, C#, and Python tools. He also works closely with Quantitative Researchers, Traders and Research Analysts on building out SIG's in-house pricing, risk, and analytics applications.

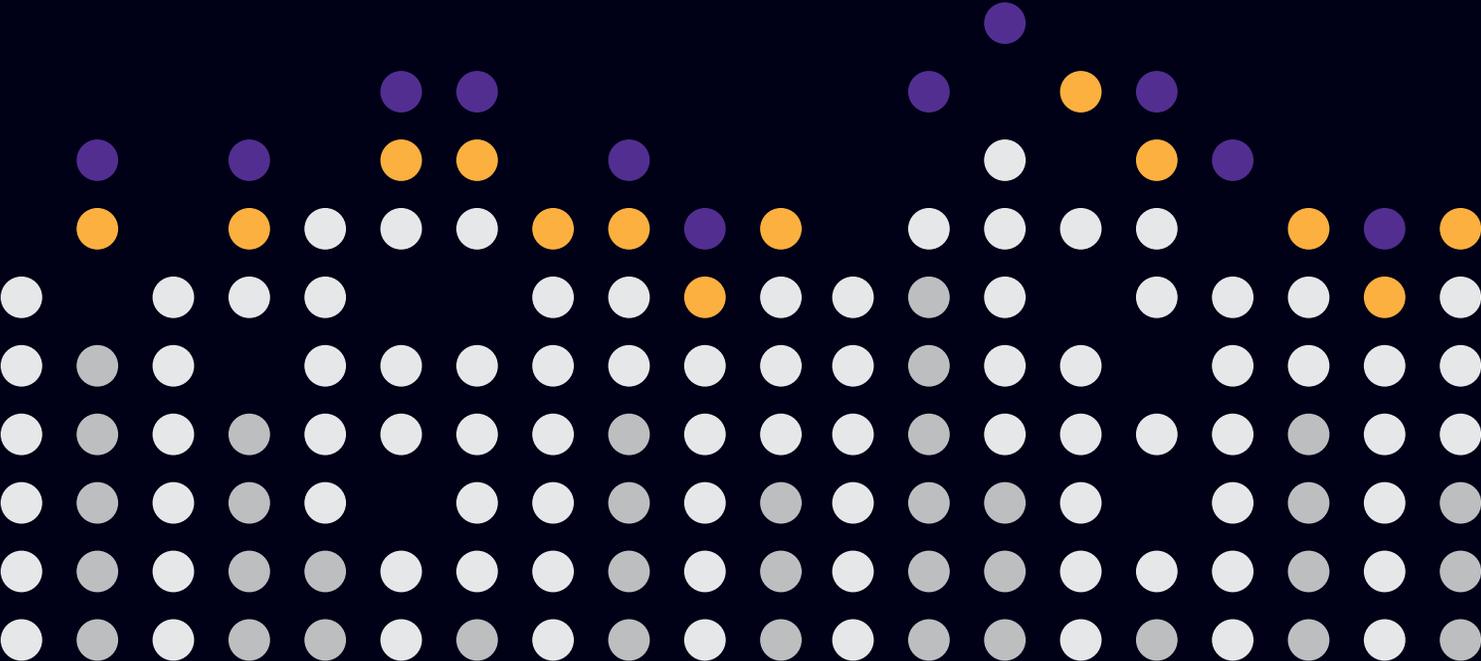


Team Alquant Brings Home the Top Prize at the 2018 University Trading Challenge Competition

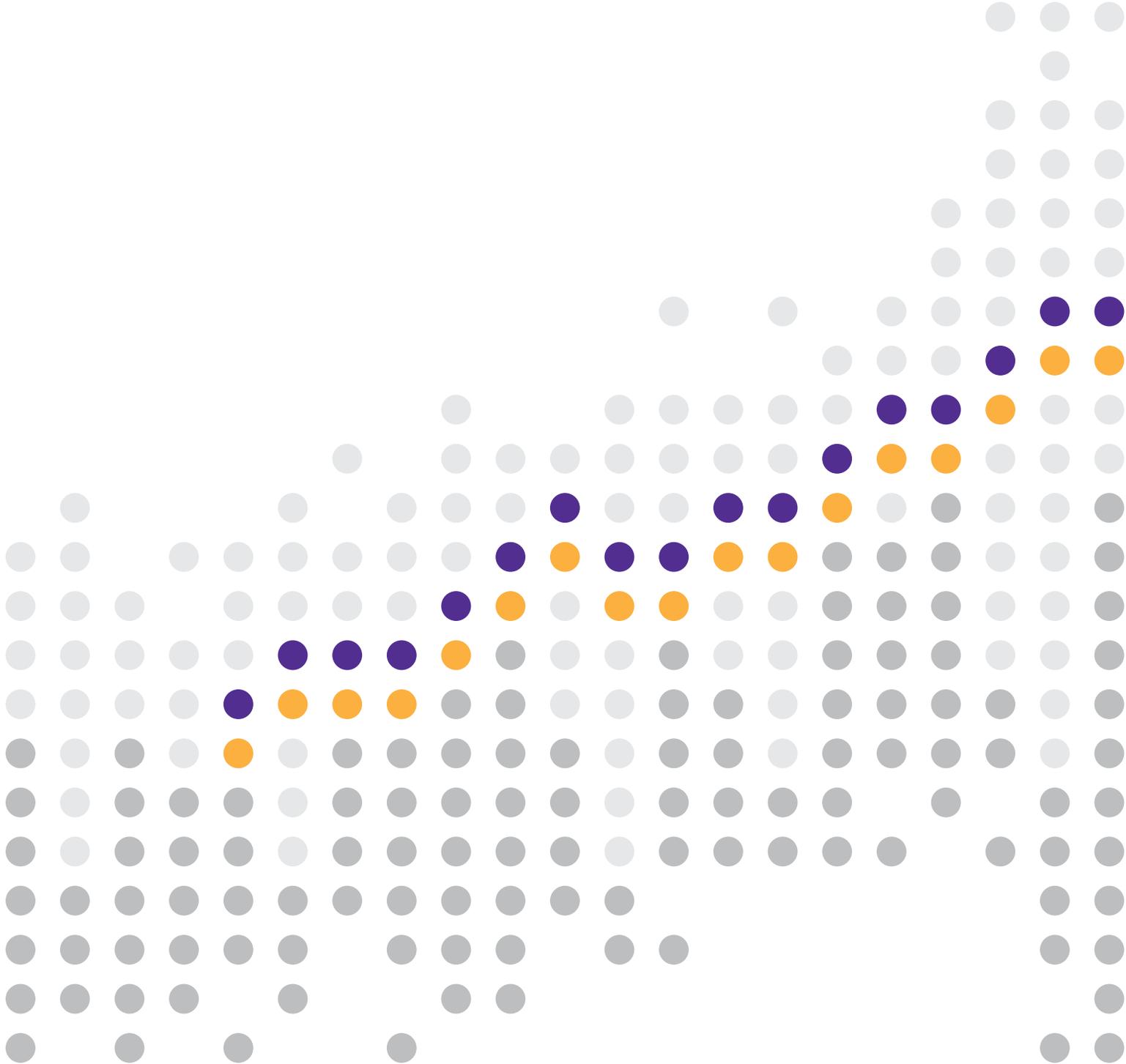
A team of graduate students from FRE won first prize for their overall performance at the annual University Trading Challenge (UTC), held on November 3, 2017 at Temple University in Philadelphia.

The competition allows finance and economics graduate students from across the U.S. to apply their academic skills to real-world trading simulations and analyze financial markets in four intensive challenges, including real-news trading, investment banking presentations, portfolio management, and foreign exchange trading.

Team Alquant was advised by Professor Ronald Slivka and comprised of Jojo Tang, Hao Zhan, and Yuehan Liu, all of whom are earning master's degrees in Financial Engineering. "I feel great pride in the wake of Team Alquant's victory," Department Chair Peter Carr said. "Our goal at NYU Tandon is to give students hands-on practical experience that will enable them to shine in the workplace, so the fact that they excelled at this year's UTC, which mimics the daily demands of a working trader, is gratifying, but not at all surprising. Their win confirms for me that NYU Tandon is educating professionals who have what it takes to succeed in the real world of global finance."



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ABOUT Catching FIRE

Contributing Writer: Zahra Patterson and Co.
Cover Photo: 12 MTC, FRE Main Office location, 26th Floor
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