M⁴

THE M⁴ CONFERENCE: ADVANCES IN FORECASTING

Machine Learning and Statistical Methods and a Novel Hybrid Approach

10-11 December 2018
Tribeca Rooftop
NYC

Organizers:

UNIVERSITY *of* NICOSIA

NYU | TANDON SCHOOL OF ENGINEERING

Why Attend

Why you must attend the M4 Conference

Accurate predictions and the correct assessment of the uncertainty surrounding them are indispensable for all types of future oriented decisions: from determining appropriate inventory and sales levels to buying/selling financial instruments.

The findings of the M4 Competition that just ended have provided a wealth of practical information for improving the accuracy of forecasts and the correct assessment of uncertainty based on a huge data base of 100,000 series covering six application domains (macro, micro, demographic, industry, financial and others) and six time frequencies (yearly, quarterly, monthly, weekly, daily and hourly). M4 Conference will elaborate on the findings of the M4, discuss their practical implications as well as how they can benefit business and other organizations in their effort to improve forecasting accuracy and correctly assess uncertainty.

The M4 Conference Program includes distinguished speakers from the major software/technology companies (Google, Microsoft, Amazon, Uber and SAS) as well as known academics from top-level universities. It features the presentation of the three most accurate methods of the M4 Competition personally by their developers who also discuss how their methods can be implemented by others, as their code is available free in GitHub. The conference covers all critical aspects of forecasting, including combining methods and introducing judgmental adjustments, paying special emphasis on the comparison of Machine Learning and Statistical forecasting methods as well as the

assessment of uncertainty. Additionally, the conference provides an excellent opportunity for networking and discussing the latest advances in forecasting by world-renowned experts.

Finally, Nassim Nicholas Taleb will deliver a keynote address discussing uncertainty in forecasting and Spyros Makridakis will present the major findings of the M4 Competition and discusses how organizations can benefit by such findings in order to improve the accuracy of their predictions and assess their uncertainty more realistically.

Who should attend the M4 Conference?

- Professionals working in companies or non-profit organizations in jobs that involve preparing forecasts and estimating uncertainty
- Financial managers who prepare their firms budget and the financial requirements for their firms
- Government officials requiring to predict receipts and expenses
- Hedge fund and other managers need to predict stock and other market variables
- Production managers requiring forecasts for their production planning activities
- Inventory managers who must predict the demand for large number of items to figure out optimal inventory levels and reordering points
- Logistics and transportation managers whose scheduling tasks need forecasts
- Academics teaching forecasting and related courses
- Students interested in forecasting for their courses or for their research

Prof. Spyros Makridakis

Spyros Makridakis is a professor of the University of Nicosia (UNIC) where he is the Director of the Institute For the Future (IFF) and an Emeritus Professor of Decision Sciences at INSEAD. He is also one of the world's leading experts on forecasting, with many journal articles and books on the subject. He is famous as the organizer of the Makridakis Competition, known in the forecasting literature as the M-Competitions.

Makridakis was part of the Greek Sailing Team in the 1960 Olympic Games and studied at the Graduate School of Industrial Studies in Piraeus (University of Piraeus, present name). After that, he joined New York University where he obtained a Ph.D. in 1969. He has held a number of teaching and research positions including positions as research fellow at IIM Berlin and Stanford University and a visiting scholar at Harvard and MIT. He joined INSEAD (Fontainebleau, France) in 1970 and was the Rector of the Neapolis University. He is also an Emeritus Professor at INSEAD that he joined in 1970. In addition to teaching and consulting expertise, he has also authored, or co-authored, 24 books including Forecasting, Planning and Strategy for the 21st Century (The Free Press), Forecasting: Methods and Applications, 3rd ed. and Forecasting Methods for Management, 5th ed. (Wiley, translated in twelve languages and sold more than 120,000 copies). He has also published more than 250 articles and book chapters. He was the founding chief editor of the Journal of Forecasting and the International Journal of Forecasting. Furthermore, he has won the "Best Teacher Award" at INSEAD twice. Spyros' current interest centers on the uses and limitations of forecasting and what we can do with the resulting uncertainty and risk given our inability to accurately predict a wide range of future events (e.g. the 2000 burst of the Internet bubble or the 2007-2009 major financial crisis). In addition, he is interested in medical decision making by comparing the costs and benefits of treatment. These and similar issues are dealt with in the book Dance with Chance: Making Luck Work for You (co-authored with Robin Hogarth and Anil Gaba) and in a special issue of the International Journal of Forecasting on "Decision Making and Planning Under Low Levels of Predictability" (co-edited with Nassim Taleb).

Keynote Speakers

NASSIM TALEB
New York University

Nassim Nicholas Taleb spent more than 20 years as a derivatives trader before starting a full-time career in research in the field of risk management and applied probability.

Taleb has been involved in risk-based policy making, advising the IMF, and the UK Prime Minister on model error and the detection and mitigation of tail exposures. He has also been hired the RAND corporation and various branches of the U.S. government and has testified twice for the United States Congress.

Taleb holds a PhD from the University of Paris and an MBA from the Wharton School. He is the author of the Incerto, a 4-volume essay on uncertainty (Antifragile, The Black Swan, Fooled by Randomness, The Bed of Procrustes), and Dynamic Hedging (1997), a technical clinical book on derivatives, in addition to Silent Risk, a freely available technical book (and reexpression of the Incerto) in applied probability theory.

SPYROS MAKRIDAKIS
University of Nicosia

Dr Spyros Makridakis is a Professor at the University of Nicosia, where he is also a Director of the Institute For the Future (IFF). He is also an Emeritus Professor at INSEAD. He has authored, or co-authored, twenty-two books and more than 250 articles.

He was the founding editor-in-chief of the Journal of Forecasting and the International Journal of Forecasting and is the organizer of the M (Makridakis) Competitions.

Invited Speakers

SCOTT ARMSTRONG
Wharton School,
University of Pennsylvania

Professor Armstrong (PhD MIT) has been on the Wharton School faculty since 1968.

He is a cofounder of the Journal of Forecasting, International Journal of Forecasting, International Institute of Forecasters, International Symposium on Forecasting, ForecastingPrinciples.com, and PollyVote.com. The latter has provided the most accurate forecasts for U.S. Presidential elections since its launch in the 2004 election.

In 2007, he was included among the "55 of the Hottest, Smartest, Most Talked About College Professors." In 2010, he was named one of the "25 Most Famous College Professors Teaching Today." He received the "Lifetime Achievement Award in Climate Science" from the Heartland Institute in March (2017).

Armstrong has had 24 international visiting appointments at 17 universities. In addition, he has given over 110 invited lectures at universities in 28 countries outside the U.S. He wrote Long-Range Forecasting (1978, 1985), edited Principles of Forecasting (2001) and has published more than 150 research papers in academic journals. If you were to read only one of his papers on forecasting, he recommends Forecasting Methods and Principles: Evidence-Based Checklists (2018). This paper has been widely read. For example, there have been 15,000 reads on ResearchGate alone.

ANDREA PASQUA
Uber

Andrea Pasqua leads Intelligent Decisions Systems at Uber, a team dedicated to employing data science methods to Forecasting, Anomaly Detection, Infrastructure and Developer tooling. Prior to joining Uber, he was Director of Data Science at Radius, applying Machine Learning to the marketing space, and, before that, he built risk models for MSCI, a financial company. He earned his Ph.D. in theoretical physics from UC Berkeley, where he worked on string theory and particle physics, and later, pursued a postdoc in biophysics.

Speakers

SLAWEK SMYL
Uber Technologies

Slawek Smyl is a Staff Data Scientist at Uber Technologies working in the area of time series forecasting.

He holds MSc in Physics from Jagiellonian University, Poland, MEng in Information Technology from RMIT, Australia, and GradD in Legal Studies from UNSW, Australia.

Slawek has ranked highly in forecasting competitions: he won Computational Intelligence in Forecasting International Time Series Competition 2016, got a third place in Global Energy Forecasting Competition in 2017, and won the M4 Forecasting Competition in 2018.

PABLO MONTERO-MANSO
University of A Coruña

Pablo Montero-Manso is a PhD Student in Statistics at the University of A Coruña, Spain. He holds a degree in Computer Science from the same university and has worked in video processing and visualization before his doctoral studies.

His research interests are in supervised and unsupervised statistical learning of complex data objects, including forecast, clustering and classification of time series, shapes and functional data.

He is an R enthusiast, has authored the TSclust package and contributed to many others.

MACIEJ PAWLIKOWSKI
ProLogistica

Maciej Pawlikowski graduated from the University of Wrocław in 2018, with MSc in computer science. His forecasting practice began in April 2018, when he started working as a data analyst / programmer at ProLogistica Soft. Two months later, the method he developed took 3rd place in the M4 Competition.

His other interests include neural networks and natural language processing.

ROBERT WINKLER
Duke University

Robert L. Winkler is James B. Duke Professor in the Fuqua School of Business and Professor in the Department of Statistical Science at Duke University. His primary research areas include decision analysis, Bayesian statistics, forecasting, and risk analysis, and he has published extensively in these areas. He was awarded the Frank P. Ramsey Medal for significant contributions to decision analysis. Recent work involves probability forecasting, combining forecasts, decision modeling, stochastic dominance, sequential decision making, and multiattribute utility.

Speakers

TIM JANUSCHOWSKI
Amazon AI Labs

Tim Januschowski is a Machine Learning Science Manager in Amazon AI Labs. He has worked on forecasting since starting his professional career. At Amazon, he has produced end-to-end solutions for a wide variety of forecasting problems, from demand forecasting to server capacity forecasting. Tim's personal interests in forecasting span applications, system, algorithm and modeling aspects and the downstream mathematical programming problems. He studied Mathematics at TU Berlin, IMPA, Rio de Janeiro, and Zuse-Institute Berlin and holds a PhD from University College Cork.

JOCELYN BARKER
Microsoft

Jocelyn began her PhD Biophysics at Stanford as a bench scientist moving around small volumes of liquid, but overtime was drawn to the power of statistical modeling. Her thesis used machine learning to identify subtypes of cancer. Now at Microsoft, she has spent the past 2 years she has been developing quantitative methods for forecasting. Her pipelines forecast 100% or Microsoft's revenue every quarter and are consumed directly by the CFO, Amy Hood, who described them as "an integral part of our financial planning and budgeting process". Her research focuses on developing novel methods for forecasting time series using machine learning methods.

MICHAEL HARRIS
Price Action Lab

Michael Harris started trading commodity and currency futures 28 years ago. He is the developer of the first commercial software program for identifying patterns in market price action. In the last seven years he has worked on the development of software for hedge funds that identifies features in time-series for use with machine learning models. Michael holds two master's degrees, one in Mechanical Engineering from SUNY at Buffalo with emphasis in control systems and optimization and another in Operations Research from Columbia University with emphasis in forecasting and financial engineering. Mike has worked for several years in the field of robotics and then in the financial sector where he de-veloped a bond portfolio optimization program and strategies for trading futures and equities. He has also worked as a long/short equity and ETF trader for a Swiss-based hedge fund. He is the author of the books "Short-Term Trading with Price Patterns" (1999), "Stock Trading Techniques with Price Pat-terns" (2000), "Profitability and Systematic Trading" (2008) and "Fooled By Technical Analysis: The perils of charting, backtesting and data-mining" (2015). Mike has also published many articles in trading magazines and in his blog, Price Action Lab Blog.

CHRIS FRY
Google

Chris Fry leads the Resource Efficiency Data Science team within Google's Technical Infrastructure division. His team provides data science support for compute and storage resource efficiency initiatives, resource load forecasting and capacity planning, as well as tools and metrics to support the efficiency initiatives. Prior to Google he was Managing Director of Strategic Management Solutions, an analytics and data science consulting firm specializing in forecasting, pricing, and supply chain optimization.

MIKE GILLILAND
SAS

Michael Gilliland is Marketing Manager for SAS forecasting software. Prior to SAS, he spent 15 years in forecasting positions in the food, consumer electronics, and apparel industries, and in consulting. Mike is author of The Business Forecasting Deal (2010), principal editor of Business Forecasting: Practical Problems and Solutions (2015), and writes The Business Forecasting Deal blog. He is column editor covering forecasting practice for Foresight: The International Journal of Applied Forecasting, and co-chaired the 2016 Foresight Practitioner Conference on Worst Practices in Forecasting. Mike serves on the Board of Directors of the International Institute of Forecasters, and received the 2017 Lifetime Achievement Award from the Institute of Business Forecasting. Mike holds a BA in Philosophy from Michigan State University, and Master's degrees in Philosophy and Mathematical Sciences from Johns Hopkins University. He is interested in issues relating to forecasting process, such as worst practices and Forecast Value Added analysis, and in applying research findings to real-life improvement in business forecasting.

PETER CARR
New York University

Dr. Peter Carr is the Chair of the Finance and Risk Engineering Department at NYU Tandon School of Engineering. He has headed various quant groups in the financial industry for the last twenty years. He also presently serves as a trustee for the National Museum of Mathematics and WorldQuant University. Prior to joining the financial industry, Dr. Carr was a finance professor for 8 years at Cornell University, after obtaining his Ph.D. from UCLA in 1989. He has over 85 publications in academic and industry-oriented journals and serves as an associate editor for 8 journals related to mathematical finance.

Speakers

DIMITRIS DRIKAKIS
University of Nicosia

Professor Dimitris Drikakis is the Vice President for Global Partnerships at the University of Nicosia.
He has a joint professor's appointment in the Schools of Science, Engineering and Medicine. Prior to that, he has held academic and executive posts as a Professor, Executive Dean, and Head of Department at various UK universities. His expertise is in computational science and he has applied it in several diverse fields, including turbulence, rocket science, and nanoscience.

He has dealt with the reduction of computational uncertainty, as well as the development of physics-based models. He has published 400 journal and conference papers and two books.
He has served on the editorial boards of several engineering, applied mathematics, applied physics, and interdisciplinary scientific journals.

YAEL GRUSHKA-COCKAYNE
Harvard Business School
Darden School of Business

Associate Professor Yael Grushka-Cockayne's research and teaching activities focus on data science, forecasting, project management, and behavioral decision-making. Her research is published in numerous academic and professional journals, and she is a regular speaker at international conferences in the areas of decision analysis, analytics, project management and management science. She is also an award-winning teacher, winning the Darden Morton Leadership Faculty Award in 2011, the University of Virginia's Mead-Colley Award in 2012, the Darden Outstanding Faculty Award in 2013, and the Faculty Diversity Award in 2013 and 2018. In 2015 Yael won the University of Virginia All University Teaching award and has been voted MBA faculty marshal in 2016, 2017 and 2018. In 2014, Yael was named one of "21 Thought-Leader Professors" in Data Science. At HBS Yael teaches the RC Technology and Operations Management course. At the Darden School, Yael taught the core Decision Analysis course, and elective courses on Project Management and Data Science in Business. Yael's recent "Fundamentals of Project Planning and Management" Coursera MOOC had over 200,000 enrolled, across 200 countries worldwide.

MARIA KOLITSIDA
Winningminds

Maria is the CEO and co-founder of Winningminds.ai. She has a strong professional experience in strategy and innovation based on emerging technologies and scientific trends. Her rich academic background includes a BSc and MSc in Neurobiology and Biotechnology (Reading University), a Policy Making & Lobbying Diploma (Michigan University), a MBA (Liverpool University), and an AI in Business Strategy Executive Program Certificate (MIT). Maria has 9 years' experience in the corporate environment as an innovation and policy maker manager and 7-years as a co-founder and advisor of tech

start-ups. Her work focuses on the application of cognitive sciences in organisational behaviour. Maria is leading the research programmes conducted by WinningMinds.ai in collaboration with Universities and Research Institutes in Canada and Europe. The research covers the fields of neuroeconomics, behaviour analysis, neurolinguistics, embodied cognitive artificial intelligence, learning and emotional psychology. Maria is also an adjunct professor of Neuromarketing courses in UK Universities.

ANTONIS POLEMITIS
University of Nicosia

Antonis Polemitis currently serves as the Chief Executive Officer of the University of Nicosia (UNIC) and EDEX, as a Board member of EDEX and UNICAF, and as a member of the Council of the University of Nicosia. UNIC serves nearly 12,000 students, along with 6,000 additional students in its affiliated academic institutions. It is the largest university in Cyprus and is the largest English language university in southern Europe.
Mr. Polemitis has two decades of experience in private equity, higher education and software development in New York, as a principal or partner at Ledra Capital, ACG Capital and Oliver Wyman (formerly Mercer Management Consulting). He has been a principal or advisor for a broad range of corporate financings in the United States, Europe, Latin America and India, ranging from multi-billion dollar industrial buyouts to early stage venture capital Mr. Polemitis helped found the world-leading Digital Currency / Blockchain Initiative at the University of Nicosia, co-taught the first university cryptocurrency course in the world, and is regularly quoted in the Wall Street Journal, USA Today, Wired and other publications as an expert on cryptocurrency issues. His research at Mercer on optimal financing strategy in private equity has been published in Buyouts and cited in the Financial Times Mr. Polemitis holds an MBA from Harvard Business School, where he graduated with highest distinction as a Baker Scholar, and a B.S. in International Studies, Accounting and Computer Information Systems from Indiana University, where he graduated with highest distinction as a Wells and Chancellor's Scholar.

VASSILIOS ASSIMAKOPOULOS
National Technical University of Athens

Vassilios Assimakopoulos is a professor at the School of Electrical and Computer Engineering of the National Technical University of Athens. He has worked extensively on applications of Decision Systems for business design and he has conducted research on innovative tools for

management support in an important number of projects. He specializes in various fields of Strategic Management, Design and Development of Information systems, Statistical and Forecasting Techniques using time series.

TAO HONG
University of North Carolina

Dr. Tao Hong is Associate Professor and Research Director of Systems Engineering and Engineering Management Department, Director of BigDEAL (Big Data Energy Analytics Laboratory), NCEMC Faculty Fellow of Energy Analytics, and associate of Energy Production and Infrastructure Center at University of North Carolina at Charlotte. He is the Founding Chair of IEEE Working Group on Energy Forecasting, Director at Large of International Institute of Forecasters, General Chair of Global Energy Forecasting Competition (gefcom.org), and author of the blog Energy Forecasting (blog.drhongtao.com). Dr. Hong is an editor of IEEE Transactions on Smart Grid, a department editor or IEEE Transactions on Engineering Management, and associate editor of International Journal of Forecasting. Dr. Hong received his B.Eng. in Automation from Tsinghua University in Beijing and his PhD with co-majors in Operations Research and Electrical Engineering from North Carolina State University

Agenda

Day 1

8:00am - 9:00am — Breakfast

9:00am - 9:15am — **Welcome / Opening Remarks**

9:15am - 9:45am — **Invited Talk**
Scott Armstrong (Wharton School, University of Pennsylvania)
Data Models versus Knowledge Models in Forecasting

9:45am - 10:15am — **Keynote Speech**
Nassim Taleb (New York University)
Forecasting and Uncertainty: The Challenge of Fat Tailedness

10:15am - 10:45am — Coffee Break and Networking

10:45am - 12:00am — **The Three Most Accurate Forecasting Methods of the M4 Competition**
- Slawek Smyl (Uber Technologies): A Hybrid Approach to Forecasting
- Pablo Montero-Manso (University of A Coruña, Spain): Combining Statistical and ML Methods
- Maciej Pawlikowski (ProLogistica, Poland): Combining Statistical Forecasting Methods

12:00pm - 1:30pm — Buffet Lunch and Networking

1:30pm - 2:45pm — **Forecasting Challenges**
- Robert Winkler (Duke University): The Value of Combining Forecasting Methods
- Tim Januschowski (Amazon): Statistical and ML Methods: Boundaries and Overlaps
- Michael Harris (Price Action Lab): Reflexivity in Financial Marketing Forecasting

2:45pm - 3:15pm — Coffee Break and Networking

3:15pm - 5:00pm — **Panel Discussion**
ML Versus Statistical Forecasting Methods: Advantages and Drawbacks
Chairperson: Peter Carr (New York University)
- Jocelyn Barker (Microsoft)
- Chris Fry (Google)
- Mike Gilliland (SAS)
- Maciej Powlikowski (ProLogistica)

5:00pm - 6:30pm — Free Time

6:30pm to 7:00pm — **Invited Talk**
Andrea Pasqua (Data Science Manager, Uber)
Forecasting at Uber: Machine Learning Approaches

7:00pm - 9:00pm — Gala Dinner & Award Ceremony of the M4 Competition Prizes

Day 2

8:00am - 9:00am — Breakfast

9:00am - 9:15am — **Opening Remarks**

9:15am - 10:00am — **Keynote Speech**
Spyros Makridakis (University of Nicosia)
The contributions of the M4 Competition to the Theory and Practice of Forecasting

10:00am - 11:15am — **Panel Discussion**
Can Deep Learning and ML Methods Improve Forecasting Accuracy?
Chairperson: Dimitris Drikakis (University of Nicosia)
- Maria Kolitsida (Winningminds)
- Slawek Smyl (Uber)
- V. Assimakopoulos (NTUA)
- Yael Grushka-Cockayne (Harvard Business School)

11:15am - 11:45am — Coffee Break and Networking

11:45am - 12:30pm — **Panel Discussion**
Incorporating Judgmental and Quantitative Forecasts
Chairperson: Antonis Polemitis (University of Nicosia)
- Robert Winker (Duke University)
- Tao Hong (University of North Caroline)
- Pablo Montero-Manso (University of A Coruña)

12:30pm - 12:45pm — **Closing Remarks and Announcing the M5 Competition**

12:45pm - 1:30pm — Buffet Lunch

Venue

Tribeca Rooftop

One of New York City's premier event venues, Tribeca Rooftop has developed a well-earned reputation for outstanding culinary expertise, impeccable service, and warm hospitality.

Address:
2 Desbrosses Street
New York, NY 10013

Award Winners & the Prizes

Prizes

Prizes	Description	Amount
1st Prize	Best performing method according to OWA	€9,000
2nd Prize	Second-best performing method according to OWA	€4,000
3rd Prize	Third-best performing method according to OWA	€2,000
Prediction Intervals Prize	Best performing method according to MSIS	€5,000
The Uber Student Prize	Best performing method according to OWA	€5,000
The Amazon Prize	The best reproducible forecasting method according to OWA	€2,000

The Winners

The winners	Affiliation	Award
1st Prize Slawek Slym	Uber Technologies	€ 9,000
2nd Prize Pablo Montero-Manso and Team	University of Coruna and Monash	€ 4,000
3rd Prize Maciej Pawlikowski	ProLogistica	€ 2,000
4th Price Slawek Slym	Uber Technologies	€ 5,000
5th Prize Pablo Montero-Manso	University of Coruna	€ 5,000
6th Prize Slawek Slym	Uber Technologies	€ 2,000

Register NOW

Regular

$699

Academic

$499

Student

$299

The registration price includes the Breakfasts, Lunches, AM/PM Coffee Breaks for Day 1 & Day 2, the Gala Dinner on Day 1 and the Conference Material

unic.ac.cy/mcompetitions

unic.ac.cy/mcompetitions