1st IEEE International Workshop on Dynamic Data Science and Big Data Analytics in Finance (DDS-BDAF 2021)
In conjunction with 45th IEEE COMPSAC (https://ieeecompsac.computer.org/2021/)

Workshop organizer(s):

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Goal of the workshop:
The workshop aims to foster cooperation among academics, researchers, and practitioners in dynamic data science applications in computational finance. This workshop will enable exchange of ideas on latest industrial experience for novel forecasting models, dynamic modeling of big data in finance, developing novel filtering, smoothing and forecasting algorithms for algo trading, machine learning and risk management.

Workshop theme:
Today, principles of computational finance are combined with advanced mathematical structures and dynamic data science to form useful financial models, strategies and products that are tested and implemented with the use of novel quantitative techniques such as smoothing/filtering/forecasting.

Use of computing technology is pervasive throughout this process.

Computational Finance is an area referred to under a variety of names, for example, 'financial engineering', quantitative finance, and 'mathematical finance'. In all cases there is an effort that involves 'financial', 'mathematical', 'quantitative' and 'computational' thinking to build, test and implement models that are at the center of financial activities. In the last decade, Computational Finance (CF) has influenced the market place extensively with enormous impact on wealth building, employment opportunities, and tremendous economic growth. This field forms an ever-expanding part of the financial sector, in numerous ways today. Use of high performance computers for research in computational finance has grown steadily in the last decade especially due to large volume of data to be analyzed. The time is ripe to collect these researchers to exchange their ideas, models and results through a conference meeting. This workshop will be a first such effort in bringing together researchers in the area of finance (i) who design and develop data-driven, data-centric and other models at a venue where computers, software and applications are the fundamental threads of discussions and arguments.

Machine Learning (ML) has become an essential part in finance industry for many decision processes including algo trading. Supervised learning is the most widely utilized form of machine learning. Its

goal is to predict the response from the associated features. Regularization puts extra constraints on a machine learning model and enhance the predictive performance of the dynamic models, and these constraints and penalties are designed to encode specific kind of prior knowledge. Algorithmic trading uses these concepts to place a trade and generate profits at a speed and frequency that is impossible for a human trader. As the models and techniques are developed and published, algo trading is becoming a tool for common investors for online trading, which otherwise has been a profitable trading strategies for professional traders. This workshop will further this direction of research.

The papers to be presented at the workshop will
(i) expose the COMPSAC attendees to an emerging and somewhat "new" activity (dynamic risk management, algo trading etc.) in Computer Science and excite them first; (ii) examine the problems in finance and bring out computing and data challenges these problem pose and how data analytics knowledge and practice could be employed to various problems in finance.

Scope of the workshop:

The papers to be presented at the workshop will cover fundamentals of finance (for example, algo trading, pricing options and other derivatives, risk management strategies etc.), introduce the computational issues therein and report latest findings and understanding of financial results that would not have been possible without the use of big data analytic models and approaches.

Computer scientists, engineers and others participating in this workshop, with or without any finance background will be able to familiarize themselves with the area of finance, expose themselves to various financial markets and will get a first-hand experience of formulating finance problem into a computational problem. They will also witness live discussions on various topics, for example, value-at-risk (VaR) analysis, risk management, portfolio management, Black-Scholes model for option pricing and beyond, difficulties in solving the resulting stochastic partial differential equation, various numerical techniques resorted to (for example, binomial lattice, finite-difference, fast Fourier transform, Monte Carlo simulation and others), handling big data in these different problems in finance and employing multi-core computers and algorithms on the above methods and techniques.

The main objective of this new workshop this year is to provide attendees with the basics of finance models, theoretical understanding and practical implementation of the models. Stronger discussions will result out of the presentations and the experience could lead them into the formulation, implementation of the models used by the practitioners in financial sector. The workshop program will essentially be of high quality.

Tentative Program Committee (to be confirmed): (Final list will be available in the workshop web page and with Call for Papers**)**

Invited speakers: (TBD)