Accomplishments of Oliver Gutsche

Scientific Accomplishments

- I joined the CMS collaboration at the LHC in 2005 and my research focus has been the search for New Physics Beyond the Standard Model of Particle Physics as well as precision Standard Model measurements.
- I was a founding member of an analysis group with members from Fermilab/UCSD/UCSB, focusing on final states with leptons.
  - measurement of the top quark cross section
  - focus shifted to new physics and beyond the Standard Model processes
  - Leaders of the WW to dilepton analysis in the CMS Higgs discovery paper
  - Searches for SUSY in same-sign and opposite-sign dilepton as well as single lepton channels.
- I have been supervising several Fermilab postdoctoral researchers helping me to pursue my research interests.
  - Together with Jacob Linacre, I concentrated on exploiting the dilepton signature to search for pair production of a heavy top-like quark (t').
  - I continued studying the properties of top quarks exploiting angular distributions of the dilepton final state.
    - top pair spin correlations and top quark polarization for the 7 TeV and 8 TeV datasets
    - top pair charge asymmetry for the 7 TeV and 8 TeV datasets
  - Since 2015, I am supervising Fermilab PostDoc Matteo Cremonesi. He created a new dark matter analysis effort at the Fermilab LHC Physics Center (LPC), searching for dark matter particles in various channels.
    - search for dark matter in events with energetic, hadronically decaying top quarks and missing transverse momentum in the 13 TeV 2016 dataset of LHC Run 2
    - search for dark matter produced in association with a Higgs boson decaying to a pair of bottom quarks in the same dataset
  - Since 2018, I am supervising Fermilab PostDoc Nick Smith. He joined the Higgs efforts of the LPC and is contributing to the analysis of the Higgs decay channel into two bottom quarks.

Managerial Accomplishments

Fermilab

- From September 2014 to September 2016, I was appointed Assistant Scientific Computing Division Head for Science Operations and Workflows in the Scientific Computing Division of Fermilab.
- In October 2016, I was appointed Deputy Head of the Scientific Services Quadrant in the Fermilab Scientific Compputing Division.

U.S.CMS LHC Operations Program

- In March 2019, I was appointed the U.S. CMS Software and Computing Operations Program manager.
- From October 2016 to February 2016, I was the deputy manager for the same operations program.
- In the U.S. CMS Software and Computing Operations Program, I was responsible for the Software and Support area from October 2016 to February 2019.

CMS Software and Computing project

- The CMS collaboration appointed me Focus Area Lead for Services and Infrastructure in the CMS Software and Computing project in 2015.

Technical Accomplishments

- I was an integral part of the community planning process for the software and computing infrastucture for the High Luminosity LHC (HL-LHC)

  - documented in the Roadmap for HEP Software and Computing R&D for the 2020s.
  - I was co-editor of the HEP Software Foundation Community White Paper Working Group - Data Analysis and Interpretation.
- My recent research interest in computing infrastructure is asking the question if analysis in HEP can be conducted more efficiently using tools developed and used by industry.
  - I am exploring using toolkits like Apache Spark or similar technologies. I created a research group spanning researchers from Fermilab, CERN and the Universities Princeton, Padova and Vanderbilt, the CMS Big Data Project
  - The project is very closely working together with industry, latest in a project with Intel concluded in January 2019 in the context of CERN openlab.
  - I managed a Lab Directed Research and Development project (LDRD) to develop innovative technology for Big Data delivery to array-based analysis code, the Striped Data Server for Scalable Parallel Data Analysis.
- In 2017, I was asked to pay tribute to 50 years of computing innovations at the Fermilab 50th Anniversary Symposium.
- In 2017 I was asked to join the editorial board of the In 2017, I was asked to join the editorial board of the journal for "Computing and Software for Big Science" published by Springer.
- In 2018, I was asked to be Co-Editor of the American Physics Society (APS) Division of Particles and Fields (DPF) white paper as input to the European Particle Physics Strategy Update 2018 – 2020, responsible for the computing section.