

Dinko Ferenček

Curriculum Vitae

Personal Information

First Name Dinko
Family Name Ferenček
Date of Birth June 11, 1983
Place of Birth Zagreb, Croatia
Citizenship Croatian
Gender Male
Marital Status Married, 1 child

Contact Information

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Education

2006–2011 **Ph.D., Physics**, University of Maryland, USA (advisor Prof. Sarah C. Eno)
Dissertation: [Search for Pair Production of First-Generation Scalar Leptoquarks in Proton-Proton Collisions at \$\sqrt{s} = 7\$ TeV](#)
2001–2006 **M.Sc., Physics**, University of Zagreb, Croatia (advisor Prof. Mirko Planinić/co-advisor Dr. Vuko Brigljević)
Diploma thesis: *WZ Boson Production in Proton-Proton Collisions at $\sqrt{s} = 14$ TeV*

Professional Experience

May 2021–Present **Senior Research Associate**, Ruđer Bošković Institute, Zagreb, Croatia
CMS Experiment at the CERN Large Hadron Collider
November 2015–May 2021 **Research Associate**, Ruđer Bošković Institute, Zagreb, Croatia
CMS Experiment at the CERN Large Hadron Collider
September 2011–October 2015 **Postdoctoral Research Associate**, Rutgers, The State University of New Jersey, USA
CMS Experiment at the CERN Large Hadron Collider
June 2007–August 2011 **Research Assistant**, University of Maryland, USA
CMS Experiment at the CERN Large Hadron Collider

August 2006–May 2007 **Teaching Assistant**, University of Maryland, USA
Physics 121: Fundamentals of Physics I

Publications

As a member of the CMS Collaboration, I am a co-author on more than 900 peer-reviewed articles published in international scientific journals¹. Below is a list of selected CMS publications to which I made significant contributions.

Selected Publications

- 2021 Ferenčec D., Roguljić M., Starodumov A., “Production, calibration, and performance of the layer 1 replacement modules for the CMS pixel detector”, *Proceedings of The 29th International Workshop on Vertex Detectors (VERTEX2020)*, JPS Conf. Proc. **34**, 010023 (2021)
- 2020 Roguljić M., Starodumov A., Karadzhinova-Ferrer A., Ferenčec D., Ahmed A. A., Jara-Casas L. M., “Low dose rate ⁶⁰Co facility in Zagreb”, *Proceedings of The 28th International Workshop on Vertex Detectors — PoS(Vertex2019)*
- 2019 Majer M., Roguljić M., Knežević, Ž., Starodumov A., Ferenčec D., Brigljević V., Mihaljević B., “Dose mapping of the panoramic ⁶⁰Co gamma irradiation facility at the Ruđer Bošković Institute – Geant4 simulation and measurements”, *Appl. Radiat. Isot.* **154** (2019) 108824
- 2018 CMS Collaboration, “Identification of heavy-flavour jets with the CMS detector in pp collisions at 13 TeV”, *JINST* **13** (2018) P05011, [arXiv:1712.07158](https://arxiv.org/abs/1712.07158)
- 2017 CMS Collaboration, “Search for dijet resonances in proton-proton collisions at $\sqrt{s} = 13$ TeV and constraints on dark matter and other models”, *Phys. Lett. B* **769** (2017) 520, [arXiv:1611.03568](https://arxiv.org/abs/1611.03568)
- 2016 CMS Collaboration, “Search for narrow resonances in dijet final states at $\sqrt{s} = 8$ TeV with the novel CMS technique of data scouting”, *Phys. Rev. Lett.* **117** (2016) 031802, [arXiv:1604.08907](https://arxiv.org/abs/1604.08907)
- 2016 CMS Collaboration, “Search for heavy resonances decaying to two Higgs bosons in final states containing four b quarks”, *Eur. Phys. J. C* **76** (2016) 371, [arXiv:1602.08762](https://arxiv.org/abs/1602.08762)
- 2015 CMS Collaboration, “Search for narrow resonances decaying to dijets in proton-proton collisions at $\sqrt{s} = 13$ TeV”, *Phys. Rev. Lett.* **116** (2016) 071801, [arXiv:1512.01224](https://arxiv.org/abs/1512.01224)
- 2015 CMS Collaboration, “Search for pair-produced vector-like B quarks in pp collisions at $\sqrt{s} = 8$ TeV”, *Phys. Rev. D* **93** (2016) 112009, [arXiv:1507.07129](https://arxiv.org/abs/1507.07129)
- 2015 CMS Collaboration, “Search for vector-like T quarks decaying to top quarks and Higgs bosons in the all-hadronic channel using jet substructure”, *JHEP* **06** (2015) 080, [arXiv:1503.01952](https://arxiv.org/abs/1503.01952)
- 2015 CMS Collaboration, “Search for resonances and quantum black holes using dijet mass spectra in proton-proton collisions at $\sqrt{s} = 8$ TeV”, *Phys. Rev. D* **91** (2015) 052009, [arXiv:1501.04198](https://arxiv.org/abs/1501.04198)
- 2014 CMS Collaboration, “Search for pair-produced resonances decaying to jet pairs in proton-proton collisions at $\sqrt{s} = 8$ TeV”, *Phys. Lett. B* **747** (2015) 98, [arXiv:1412.7706](https://arxiv.org/abs/1412.7706)

¹Source: INSPIRE-HEP literature database <https://inspirehep.net>

- 2013 CMS Collaboration, “Search for narrow resonances and quantum black holes in inclusive and b-tagged dijet mass spectra from pp collisions at $\sqrt{s} = 7$ TeV”, *JHEP* **01** (2013) 013, [arXiv:1210.2387](#)
- 2011 CMS Collaboration, “Search for First Generation Scalar Leptoquarks in the $evjj$ Channel in pp Collisions at $\sqrt{s} = 7$ TeV”, *Phys. Lett. B* **703** (2011) 246, [arXiv:1105.5237](#)
- 2011 CMS Collaboration, “Missing transverse energy performance of the CMS detector”, *JINST* **6** (2011) 09001, [arXiv:1106.5048](#)
- 2011 CMS Collaboration, “Search for Pair Production of First-Generation Scalar Leptoquarks in pp Collisions at $\sqrt{s} = 7$ TeV”, *Phys. Rev. Lett.* **106** (2011) 201802, [arXiv:1012.4031](#)
- 2007 V. Brigljević et. al., “Study of di-boson production with the CMS detector at LHC”, *J. Phys. G* **34** (2007) N269-N295

CMS Public Documents²

- 2016 CMS Collaboration, “Searches for narrow resonances decaying to dijets in pp collisions at $\sqrt{s} = 13$ TeV using 12.9 fb^{-1} ”, *CMS Physics Analysis Summary* **EXO-16-032**
- 2016 CMS Collaboration, “Identification of double-b quark jets in boosted event topologies”, *CMS Physics Analysis Summary* **BTV-15-002**
- 2016 CMS Collaboration, “Identification of b quark jets at the CMS Experiment in the LHC Run 2”, *CMS Physics Analysis Summary* **BTV-15-001**
- 2015 CMS Collaboration, “Search for Narrow Resonances using the Dijet Mass Spectrum with 42 pb^{-1} of pp Collisions at $\sqrt{s} = 13$ TeV”, *CMS Physics Analysis Summary* **EXO-15-001**
- 2015 CMS Collaboration, “First Results from Dijet Resonance Search using 37 pb^{-1} of proton-proton collisions at $\sqrt{s} = 13$ TeV”, *CMS Detector Performance Summary* **DP-2015-017**
- 2013 CMS Collaboration, “Search for pair-produced vector-like quarks of charge $-1/3$ in lepton+jets final state in pp collisions at $\sqrt{s} = 8$ TeV”, *CMS Physics Analysis Summary* **B2G-12-019**
- 2013 CMS Collaboration, “Performance of b tagging at $\sqrt{s} = 8$ TeV in multijet, $t\bar{t}$ and boosted topology events”, *CMS Physics Analysis Summary* **BTV-13-001**
- 2013 CMS Collaboration, “Search for Heavy Resonances Decaying into $b\bar{b}$ and bg Final States in pp Collisions at $\sqrt{s} = 8$ TeV”, *CMS Physics Analysis Summary* **EXO-12-023**
- 2012 CMS Collaboration, “Search for b-jet Resonances in pp Collisions at $\sqrt{s} = 7$ TeV”, *CMS Physics Analysis Summary* **EXO-11-008**
- 2010 CMS Collaboration, “Performance of Missing Transverse Energy Reconstruction in $\sqrt{s} = 900$ and 2360 GeV pp Collision Data”, *CMS Physics Analysis Summary* **JME-10-002**
- 2009 CMS Collaboration, “Offset Energy Correction for Cone Jets”, *CMS Physics Analysis Summary* **JME-09-003**

²Internally reviewed but not published in journals. Available at <http://cdsweb.cern.ch/collection/CMS>

International Collaborations

- 2005–Present CMS Collaboration at CERN
- 2016–Present RD50 Collaboration at CERN

Memberships and Other Professional Activities

- March 2018–Present Reviewer of yearly project reports for the Croatian Science Foundation
- April 2016–Present Member of Croatian Physical Society
- February 2011–April 2016 Member of American Physical Society

Organization of International Conferences and Workshops

- October 13-18, 2019 Member of the Local Organizing Committee for the 28th International Workshop on Vertex Detectors, Lopud, Croatia
- April 30-May 3, 2019 Member of the Local Organizing Committee for the Game of Flavours - CMS Heavy Flavour Tagging Workshop 2019, Dubrovnik, Croatia
- September 17-22, 2018 Member of the Organizing Committee for the LHC Days in Split 2018 conference, Split, Croatia
- April 11-13, 2018 Member of the CMS Organizing Committee for the CMS Heavy Flavour Tagging Workshop 2018, Brussels, Belgium

Talks, Seminars, and Posters

- October 10, 2020 “Production, calibration and performance of the layer 1 replacement modules for the CMS pixel detector”, Poster at VERTEX 2020: The 29th International Workshop on Vertex Detectors (virtual)
- February 27, 2020 “Machine Learning in High Energy Physics”, Seminar of the Centre of Research Excellence for Data Science and Advanced Cooperative Systems ACROSS–DataScience, Zagreb, Croatia
- December 9, 2019 “CMS activities in Zagreb”, CROHEP Meeting, Zagreb, Croatia
- October 16, 2018 “Status report for Research Area 4: Multidisciplinary Data Intensive Applications, 4.1 Particle physics and astrophysics”, 3rd International Workshop on Data Science, Zagreb, Croatia
- October 16, 2018 “Usage of Deep Neural Networks to Tag Boosted Higgs Bosons Decaying into Bottom Quarks”, Poster at the 3rd International Workshop on Data Science, Zagreb, Croatia
- September 17, 2018 “Double Higgs boson searches overview”, LHC Days in Split, Split, Croatia
- April 13, 2018 “Status of the double-b tagger”, CMS Heavy Flavour Tagging Workshop 2018, Brussels, Belgium
- October 13, 2017 “Search for Heavy Resonance and Dark Matter Using Jets at the LHC”, Invited Talk at the 10th Meeting of the Scientific Division of the Croatian Physical Society, Baška, Island Krk, Croatia
- November 30, 2016 “Machine Learning in High Energy Physics”, Poster at the First International Workshop on Data Science, Zagreb, Croatia
- July 19, 2016 “Identification of b jets in boosted event topologies with CMS”, BOOST2016, Zürich, Switzerland

- April 15, 2015 “Multijet Searches at the LHC: Run 1 Highlights and Prospects for Run 2”, UMD HEP Seminar, College Park, MD, USA
- November 5, 2014 “Boosted Higgs and b-tagging and other tools/techniques”, BSM Higgs Workshop @ LPC, Fermilab, USA
- August 19, 2014 “CMS b and quark/gluon tagging”, BOOST2014, University College London, London, UK
- October 3 and 24, 2013 “b Tagging in Boosted Event Topologies (Parts I and II)”, High Energy Experimental Seminar, Rutgers, The State University of New Jersey, Department of Physics & Astronomy, Piscataway, NJ, USA
- September 26, 2013 “Top/Higgs Tagging at the LHC”, LPC Workshop on Exotic Top Partners, Fermilab, USA
- November 12, 2012 “LHC Searches with Jets and Photons”, Chicago 2012 Workshop on LHC Physics, Chicago, IL, USA
- September 6, 2012 “Search for Physics Beyond the Standard Model in Fully Hadronic Final States with the CMS Detector at the LHC”, Division of Experimental Physics Seminar, Ruđer Bošković Institute, Zagreb, Croatia
- July 11, 2012 “Latest Exotica Results with Jets in the Final State from the CMS Experiment”, Santa Fe 2012 Summer Workshop “LHC Now”, Santa Fe, NM, USA
- March 19, 2012 “Hadronic Exotica Searches at CMS”, SEARCH Workshop, College Park, MD, USA
- June 9, 2011 “Search for Pair Production of First-Generation Scalar Leptoquarks with the CMS Experiment at CERN”, High Energy Physics Seminar, Johns Hopkins University, Department of Physics & Astronomy, Baltimore, MD, USA
- May 31, 2011 “Search for Pair Production of First-Generation Scalar Leptoquarks with the CMS Experiment at CERN”, High Energy Experimental Seminar, Rutgers, The State University of New Jersey, Department of Physics & Astronomy, Piscataway, NJ, USA
- May 1, 2011 “Search for Pair Production of First-Generation Scalar Leptoquarks in pp Collisions at $\sqrt{s} = 7$ TeV”, APS April Meeting, Anaheim, CA, USA
- October 30, 2010 “Results of a Search for Pair Production of First-Generation Scalar Leptoquarks in pp Collisions at $\sqrt{s} = 7$ TeV”, USLUO Annual Meeting, Fermilab, USA

Grants and Awards

- May 2019–Present Received a Croatian Science Foundation PhD grant DOK-01-2018 “Projekt razvoja karijera mladih istraživača - izobrazba novih doktora znanosti”, PhD student: Saswat Mishra
- June 2017–Present Associate on the Croatian Science Foundation grant IP-2016-06-3321 “Hundred twenty five Megapixels to discover Fermionic Higgs couplings and New Particles at the Large Hadron Collider”, Primary investigator: dr. sc. Vuko Brigljević
- December 17, 2019 Together with colleagues Benjamin Mesić, Tatjana Šuša and Vuko Brigljević among the recipients of the Ruđer Bošković Institute’s yearly award for the best scientific papers in 2018 for the publication of “Observation of Higgs boson decay to bottom quarks”, *Phys. Rev. Lett.* **121** (2018) 121801, [arXiv:1808.08242](https://arxiv.org/abs/1808.08242)
- May 3, 2019 Financial support of the Croatian Ministry of Science and Education for applications to competitive projects based on the application to the H2020-MSCA-IF-2018 call (Total amount: 25 000 HRK)

- 2017–2018 Received [Cogito](#) (French-Croatian Hubert Curien Partnership Programme) grant for 2017–2018. Project title: “**ABC: Advance B** tagging in **CMS**”
- April 25, 2018 Financial support of the Croatian Ministry of Science and Education for applications to competitive projects based on the application to the H2020-MSCA-IF-2017 call (Total amount: 40 000 HRK)
- March 5, 2018 Awarded the Seal of Excellence for a proposal submitted under the Horizon 2020’s Marie Skłodowska-Curie Actions call H2020-MSCA-IF-2017 (Total score: 92.80%)
- October 2017 Received [NVIDIA GPU Grant](#) (Titan Xp graphics card for development of b tagging algorithms based on modern machine learning techniques)
- April 24, 2017 Financial support of the Croatian Ministry of Science and Education for applications to competitive projects based on the application to the H2020-MSCA-IF-2016 call (Total amount: 25 624 HRK)
- April 24, 2017 Awarded the Seal of Excellence for a proposal submitted under the Horizon 2020’s Marie Skłodowska-Curie Actions call H2020-MSCA-IF-2016 (Total score: 89.20%)
- April 2011 DPF Student Travel Award for the APS April Meeting
- October 2007 Received honorable mention for the Ralph Myers Teaching Award for excellence in teaching in the 2006-2007 academic year
- 2002–2006 Croatian Ministry of Science, Education and Sports Scholarship for exceptional students
- 2005 CERN Summer Student Programme Scholarship of the Croatian Ministry of Science, Education and Sports

Schools and Workshops

- September 25–29, 2017 Attended 2nd International Summer School on Data Science (SSDS 2017) in Split, Croatia
- July 18–22, 2016 Attended BOOST2016: 8th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in Zürich, Switzerland
- August 10–14, 2015 Attended BOOST2015: 7th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in Chicago, IL, USA
- August 18–22, 2014 Attended BOOST2014: 6th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in London, UK
- August 11–16, 2013 Attended BOOST2013: 5th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in Flagstaff, AZ, USA
- August 2008 Attended CTEQ-MCnet Summer School on QCD Phenomenology and Monte Carlo Event Generators in Debrecen, Hungary
- Summer 2005 CERN Summer Student

Teaching, Supervising and Mentoring

- June 2019–Present Mentoring Ph.D. student Saswat Mishra
- October, 2020 Taught “Introduction to MVA Methods” as part of the [Methods of Statistical Analysis and Pattern Recognition with Applications in Particle Physics](#) course for PhD students at the Department of Physics, University of Zagreb
- Fall 2018 As part of the “Fall student projects in the Division of Experimental Physics at RBI”, mentored undergraduate student Juraj Ovčar with the project “Study of the passage of an ion beam through the Token Bit Manager of the CMS pixel detector module (Studija prolaska snopa iona kroz Token Bit Manager modula CMS piksel detektora)”

- March, 2018 Taught “Introduction to MVA Methods” as part of the [Statistical methods in data analysis](#) course for PhD students at the Department of Physics, University of Zagreb
- Fall 2017 As part of the “Fall student projects in the Division of Experimental Physics at RBI”, together with Andrey Starodumov co-mentored undergraduate student Arian Ivec with the project “[Study of the properties of the Readout Chip of the CMS pixel detector \(Proučavanje svojstava Readout Chipa CMS piksel detektora\)](#)”
- July 14, 2017 Mentored Matej Roguljić, **mag. phys.**, Department of Physics, Faculty of Science, University of Zagreb
Diploma thesis: Development of an algorithm for identification of boosted Higgs bosons decaying in two b quarks using the upgraded CMS pixel detector
- July 8, 2016 Mentored Lucija Bajan, **mag. phys.**, Department of Physics, Faculty of Science, University of Zagreb
Diploma thesis: Search for dijet resonances at masses below 1 TeV in proton-proton collisions at a center-of-mass energy of 13 TeV at the Large Hadron Collider
- 2011–2015 As a postdoc at Rutgers University, supervised several undergraduate and PhD students

Media and Outreach

- June 28, 2020 Statement for the newspaper article “[Superudarač od 100 km](#)” in Večernji list
- March 2 and 4, 2020 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held at Ruđer Bošković Institute, Zagreb
- April 16–19, 2019 Co-organized and guided a visit of Zagreb physics students to CERN
- February 25 and March 11, 2019 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held at Ruđer Bošković Institute, Zagreb
- October 29, 2018 Guest in the radio show “Okrugli stol ponedjeljkom”, Croatian Radio 3 (Hrvatski radio 3)
- October 10, 2018 Guest in the radio show “Drag mi je Platon”, Croatian Radio 1 (Hrvatski radio 1)
- October 9, 2018 Appearance in the TV show “Znanstveni krugovi”, Croatian Radiotelevision (Hrvatska radiotelevizija)
- May 8, 2018 Live video interview from CMS Control Room at the LHC Point 5 with students from Stjepan Radić Elementary School in Brestovec Orehovički, Croatia
- March 19, 2018 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held in [Prva gimnazija Varaždin](#), Varaždin
- February 20, 2018 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held at Ruđer Bošković Institute, Zagreb
- October 7, 2017 Panel speaker at the symposium organized as part of the contemporary art [Touch Me Festival 2017: The Invisible Around Us](#) held in Zagreb
- April 27–28, 2017 Guided Zagreb physics students during their visit to CERN
- April 27, 2017 Appearance in the TV show “[Treći element: Dimenzije prostora i materije](#)”, Croatian Radiotelevision (Hrvatska radiotelevizija)
- April 3, 2017 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students hosted by [Biskupijska klasična gimnazija Ruđera Boškovića s pravom javnosti](#) at the University of Dubrovnik, Dubrovnik
- March 24, 2017 “The dark side of the starry sky (and can LHC shed some light on it) [Tamna strana zvjezdanog neba (i može li nam ju LHC rasvijetliti)]”, Virovitica Town Library (Gradska knjižnica i čitaonica Virovitica), Virovitica

- March 24, 2017 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held in Gimnazija Petra Preradovića, Virovitica
- March 10 and 31, 2017 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held at Ruđer Bošković Institute, Zagreb
- May 14, 2016 “The dark side of the starry sky and how can LHC shed some light on it (Tamna strana zvjezdanog neba i kako nam ju LHC može obasjati)”, [Open Days](#) at Ruđer Bošković Institute, Zagreb
- March 25, 2016 “Busy bees”, Fermilab at Work
- March 14, 2016 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held in Gimnazija Požega, Požega
- February 19, 2016 Mentor at the “[International Masterclasses – Hands on Particle Physics](#)” outreach event for high school students held at Ruđer Bošković Institute, Zagreb
- February 15, 2016 “Looking for signs: dijet resonances”, Fermilab at Work
- November 23–24, 2015 Guided Zagreb physics students during their visit to CERN
- April 2, 2015 “Dinko Ferencek (Ph.D. ’11, Physics) Talks Particle Physics”, UMD CMNS News
- January 30, 2015 “One measurement, many implications”, Fermilab Today, Frontier Science Result: CMS
- January 17, 2013 “A Search for ‘God particle’: A Story of Unification”, Croatian Hour, Embassy of the Republic of Croatia, Washington, DC, USA
- February 25, 2011 “[First supersymmetry results from the LHC](#)”, Fermilab Today, CMS Result
- February 11, 2011 “[CMS joins the hunt for leptoquarks](#)”, Fermilab Today, CMS Result of the Month
- April 29, 2010 Guided Croatian physics students during their visit to the CMS Analysis Center at CERN
- June 19, 2009 “Welcome to CERN” presentation for a group of mechanical engineering students from Zagreb visiting CERN
- May 1, 2009 Guided Zagreb physics students during their visit to the CMS detector at CERN

Computer Skills

Operating Systems	Experience with administration of Linux and Microsoft Windows operating systems
Office Automation	L ^A T _E X, LibreOffice/OpenOffice, Microsoft Office
Programming Languages	C/C++, Python, knowledge of Fortran at the reading level, comfortable with shell scripting
Version Control	Experience with CVS, SVN, and Git
Analysis Tools and Packages	ROOT, RooFit, TMVA, Mathematica
Batch Systems	Experience with Condor and LSF
Event Generators	Experience with Pythia and MadGraph event generators
CMS Software Tools	Extensive experience with CMSSW, CRAB, and PAT

Languages

Croatian	Native
English	Full professional proficiency

CMS-related Experience

- ARC Duties Served as an ARC member for HIN-12-003, EXO-12-042, JME-13-002, EXO-13-008, B2G-14-002, HIN-14-007, B2G-14-001, JME-14-002, HIN-15-012, B2G-16-003 (ARC Chair), JME-16-003, EXO-16-045 (ARC Chair), B2G-17-009, EXO-17-011, B2G-17-004 (ARC Chair), EXO-17-019, HIN-18-002, FTR-18-004, EXO-18-011, HIG-18-027, TOP-18-012, SMP-18-013, HIG-19-017, B2G-19-005, B2G-19-002 (ARC Chair)
- As part of the HIN-12-003 review, proposed a novel trigger combination algorithm that minimizes the statistical uncertainties for data collected using several prescaled triggers. The algorithm has later been used in HIN-14-007 and HIN-15-012
- Editorial Duties Served as the editor for the combined EXO-11-094 + EXO-11-008 [paper](#)
- CWR Institutional Reviews Contributed to the Institutional Review of HIG-11-027, BTV-12-001, EXO-12-016, BPH-13-004, HIG-13-004, HIG-13-021, SUS-13-019, HIG-13-024, EXO-12-053, B2G-16-013, HIN-16-006, B2G-17-005, SUS-19-013
- October 2020–Present Serving as a L3 co-convener of the Pixel Offline group
- June 2019–Present Involved in a measurement of the VHbb process using the full Run 2 data (HIG-20-001)
- July 2017–September 2020 Involved in quality assurance of CMS pixel modules with the goal of building and testing modules for a replacement of the innermost layer of the Phase-1 CMS pixel detector. Work done in close collaboration with colleagues from Paul Scherrer Institute, ETH Zürich and Helsinki Institute of Physics.
- January 2015–March 2020 Served as RECO and PAT contact for the BTV POG
- October 2016–December 2019 Served as EOS space manager for the Exotica PAG
- Developed a set of software tools for managing the EXO EOS space at CERN (<https://gitlab.cern.ch/ferencek/ExoEosTools>)
- December 2018–October 2019 Involved in the design, construction and operation of a test setup built at the ⁶⁰Co irradiation facility at RBI for low-dose rate irradiation of the pixel detector readout chip prototypes for the HL-LHC. Work done in close collaboration with colleagues from CERN.
- One of my main tasks was the design and construction of an uninterrupted dry air supply for the test setup
- September 2012–June 2019 Made key contributions to the development and commissioning of subset b tagging used in Higgs and top tagging algorithms employed in searches for new physics in boosted event topologies. Also made key contributions to the development and commissioning of double-b tagging algorithm used for Higgs tagging.
- March 2018–April 2019 Participated in several beam test campaigns at the Tandem Van de Graaff accelerator at RBI to study single event upsets in the Token Bit Manager chip of the CMS pixel detector module
- Developed a software tools for running the data acquisition chain and catching single event upsets (<https://gitlab.cern.ch/CMS-IRB/PixelTools>)
- May 2016–November 2018 Served as a Pixel Tracker Detector On-Call (Pixel DOC) expert shifter

- July 2014–June 2017 Involved in a search for dijet resonances in pp collisions at $\sqrt{s} = 13$ TeV
- January 2016–August 2016 Served as a L3 co-convenor of the Exotica Jets+X Working Group (successor of the Multijets Working Group)
- October 2014–December 2015 Served as a L3 co-convenor of the Exotica Multijets Working Group
- April 2012–July 2016 Maintained a “bump hunt” limit setting tool used in Exotica dijet analyses for setting Bayesian upper limits (more information available at <https://twiki.cern.ch/twiki/bin/view/CMS/DijetLimitCode>)
- July 2015 Prepared and led the *b*-tagging HATS@LPC held at Fermilab, USA
- January 2015 Prepared and led the *b* tagging and *EXO Dijet Resonances* exercises at the CMS Data Analysis School 2015 held at Fermilab, USA
- January 2013–December 2014 Served as a L3 co-convenor of the BTV POG Algorithms and Software Subgroup
- Maintained b-tagging software framework and documentation, served as RECO and PAT contact and was in charge of code integration
 - Contributed to studies of the b-tagging performance in the context of CMS detector upgrades for the HL-LHC
 - Made key contributions to the rewriting of the b-tagging software framework as part of the CMS preparations for LHC Run 2, making it possible to run b-tagging algorithms from a reduced event data format and retaining the same level of flexibility as in Run 1
 - Developed jet flavor definition based on the *ghost association* of generator-level hadrons/partons to reconstructed jets which is now the default jet flavor definition at CMS (more information available at <https://twiki.cern.ch/twiki/bin/view/CMSPublic/SWGGuideBTagMCTools>)
 - Wrote extensive documentation on applying b-tagging efficiency scale factors to simulated events (more information available at <https://twiki.cern.ch/twiki/bin/viewauth/CMS/BTagSFMethods>)
- September 2012–September 2013 Involved in a search for vector-like bottom quark partners in single-lepton final states (B2G-12-019)
- August 2012–December 2014 Involved in a search for paired dijets (EXO-12-052)
- December 2011–December 2013 Served as a b-tagging object expert for the Exotica PAG and an Exotica PAG contact person for the BTV POG
- September 2011–April 2013 Designed and carried out a search for b-jet resonances in pp collisions at $\sqrt{s} = 7$ TeV (EXO-11-008) and remained involved in a related search at $\sqrt{s} = 8$ TeV (EXO-12-023)
- January 2011 Prepared and led the *MET and High-MET Event Scan Exercise* at the CMS Data Analysis School 2011 held at Fermilab, USA
- 2009–2011 Involved in a search for pair production of first-generation scalar leptoquarks in *eejj* and *eνjj* channels
- Actively contributed to development of software analysis tools

- Acquired extensive experience with the Physics Analysis Toolkit (PAT)
 - Experience with producing private Monte Carlo samples and preparing generator card files for the official Monte Carlo production
 - Experience with all steps of the analysis, from ntuple making to producing final limit plots
 - Performed optimization of the final event selection criteria
 - Presented [pre-approval talk](#) for the *evjj* channel analysis
- 2010–2011 Involved in a scan of high-MET events
- From January to May 2011, coordinated a high-MET event scan effort within the MET Working Group (more information available at <https://twiki.cern.ch/twiki/bin/view/CMS/MissingETScanners>)
- November 2009–September 2010 Developed and maintained a JetMET history DQM tool (more information available at <https://twiki.cern.ch/twiki/bin/view/CMS/JetMETHistoryDQM>)
- February 2009–July 2010 Based at CERN performing the following HCAL service work activities:
- Responsible for HCAL pedestal tuning
 - Worked on HCAL DQM code development
 - HCAL test beam 2009: worked on wire chamber calibration and was in charge of setting up the test beam DQM (<https://twiki.cern.ch/twiki/bin/view/CMS/TestBeam2009>, <https://indico.cern.ch/event/65028/contribution/2/material/slides/0.pdf>)
 - During the last 12 months at CERN served as one of the on-call HCAL operations experts
 - During the last 4 months at CERN served as one of the HCAL Prompt Feedback Group contacts
 - In June 2010, served as an HCAL Operations Coordinator
 - Within the HCAL Noise Task Force, worked as one of the main developers of the HF noise cleaning algorithms later included in the standard event reconstruction
- Late 2009–Early 2010 Contributed to MET commissioning studies with first collision data at $\sqrt{s} = 900$ and 2360 GeV
- August 2009–End of 2009 Worked on DataMixer validation (more information available at <https://twiki.cern.ch/twiki/bin/view/CMS/DataMixerValidation>)
- Summer 2008–End of 2009 Worked on the offset (L1) jet energy correction (more information available at <https://twiki.cern.ch/twiki/bin/view/CMS/OffsetCorrection>)
- Presented [pre-approval](#) and [approval](#) talks for the JME-09-003 analysis

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