ADRIAN BUZATU

Postdoctoral researcher
Experimental Particle Physics (Higgs)

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OVERVIEW

As a researcher in experimental particle physics, my goal is to measure precisely the Standard Model (SM) processes and search of physics beyond the SM. For the last eleven years I have been a leading and visible analyser in the search for the Higgs boson decaying to bottom quark pairs ($H \to b\bar{b}$), with outcomes of two evidences (3 σ, CDF & ATLAS) and one observation (5 σ, ATLAS). With the coupling of Higgs and b quarks established, I plan to use it as a tool to search for new physics in generic 2HDM. I was a key analyser in the first search for Higgs and charm quark coupling ($H \to c\bar{c}$). I also performed searches for additional Higgs boson from BSM models. I have expertise in all aspects of a data analysis, including software design, machine learning, statistical analysis, and mentoring and leading students.

I also have a track record of attracting awards, fellowships and research grants, publishing papers and conference notes, research-led teaching, science communication, and administrative duties.

ATLAS POSTDOCTORAL RESEARCH

Apr 2017 - present: Research Fellow, Academia Sinica, Taiwan; PI: Song-Ming Wang.
▽ Leading analyser on the ATLAS SM $VH(bb)$ observation submitted paper with 2015+'16+'17 data:
o 0-lepton and across channels $m_{b\bar{b}}$ resolution improvement, object reconstruction, software framework.
▽ Key analyser on the following ATLAS searches on 2015+2016 data:
o SM VH(bb), JHEP 2017, ATLAS-alone evidence for SM $VH(bb)$.
o SM Z(ll)H(cc), PRL 2018, World's first direct search on $H(cc)$.
o BSM $A \to ZH(H \to b\bar{b})$, PLB 2018, ATLAS's first search on degenerate 2HDM baryogenesis.
o BSM $V(qq)H$(invisible), JHEP 2018 (submitted to), only one of three analysers.
o BSM $X \to Vh(h \to b\bar{b})$, JHEP 2018, HVT and non-degenerate 2HDM models.

Leading effort of Combined Performance on b-jet energy calibrations in Run-2 ATLAS software used in analyses with 2015+'16+'17 data, improving $m_{b\bar{b}}$ resolution and thus sensitivity of $H \to b\bar{b}$ searches.

Leading effort of CxAOD data analysis software framework, used by about 35 analyses. Progressed from Jet code developer in the last couple of years, to core developer since Sept 2017, and then co-convener since Jan 2018. Led the successful migration from R20 to R21. Designed fast and robust automated workflows of data processing for the very large number of samples used by VH(bb), which sped up data to results times by a factor of three. Also introduced robust continuous integration via GitLab pipelines.

Detector operations on data quality monitoring: taking numerous ATLAS Control Room shifts plus on-call expert shifts, as well as maintaining DQM monitoring software.

Detector upgrade on the High Granularity Timing Detector (HGTD): taking test beam shifts.

Sep 2016 - Mar 2017: Research Fellow, Tsinghua University, P. R. China; PI: Xin Chen.
Continued from Glasgow plus new analyses, Run-2 SM VH ($H \to c\bar{c}$) and BSM $A \to ZH$ ($H \to b\bar{b}$), and co-leading developing an ATLAS-wide b-jet energy correction by merging $h \to b\bar{b}$ and $t\bar{t}$ efforts.

2011 - Aug 2016: Research Associate, Univ. of Glasgow, UK; PI: Aidan Robson, Tony Doyle.
Ported offline b-tagging algorithms to the online, improving b-jet trigger data taking in Run-2.
Developed and implemented the b-jet energy corrections used in all the Run-2 $h \to b\bar{b}$ analyses.
Hbb & DBL: CxAOD framework development & production. Jet reconstruction & calibration contact.
Activity groups: HLT (Trigger), Hbb (Higgs), Xbb (JSS+BTag), JES/JER (JetEtMiss), DBL (Exotics).
Analyses: Run-1 and Run-2 SM VH ($h \to b\bar{b}$) and Run-2 BSM $A \to Zh$ ($h \to b\bar{b}$).

EDUCATION

2004 - 2011: MSc & PhD, McGill Univ., Montreal, Canada; supervisor Andreas Warburton.
PhD Thesis: *"Search for the Standard Model Higgs boson produced in association with a W Boson in the isolated-track charged-lepton channel using the Collider Detector at Fermilab"*, arXiv:1110.5349.
For summer 2011, I lead the analysis, and had the world's best 95% CL limit of all $H \to b\bar{b}$ searches.

AWARDS

2016: Distinguished Poster Prize, offered to top 4% of the posters, at the ICHEP 2016, Chicago, US.
2009: Best Particle Physics Oral Presentation, at the CAP Congress, Canada (200 CAD).
1999 - 2001: Five Prizes (Olympiads and other competitions) at Romanian national high school level.

FELLOWSHIPS

2006-2009: McGill Major Fellowship '06 (5,000 CAD), McGill Principal's Fellowship '09 (2,500 CAD).
2001-2003: INSA Fellowship for 2/3 of the undergraduate study costs (4,000 EUR).

RESEARCH GRANTS

2016: Chinese Chung-Yao Chao Fellowship (details) for two years (80,000 CHY / year).
2016: Tsinghua University Postdoc Support Plan A Fellowship for two years (50,000 CHY / year).
2016: Carnegie Trust Fellowship plus U. of Glasgow supplement for one summer student (1,710 GBP).
2014: EPLANET Visiting Scholar, Federal University of Rio de Janeiro, Brazil (3,500 EUR).
2013-2014: University of Glasgow twice funding for a summer research student (2 x 1,050 GBP).
2012: Nuffield fellowship for one summer research high school student (600 GBP).
2011: Universities Research Association FNAL Visiting Scholar Fellowship (10,000 USD).

PUBLICATIONS

I am an co-author on 328 CDF papers published in peer reviewed journals and 471 from ATLAS.

My CDF work contributed directly to 4 PRL & 4 PRD papers. Based on two analysis techniques I developed, I first-authored a NIM A paper, & co-authored a highly-cited NIM A submitted arXiv paper.

In ATLAS I had major contributions to 7 papers, 2 conf notes, and 1 pub note. Analyses techniques I developed are used also in papers not shown here.

I have also authored three conference proceedings.

For easy access, publications are ranked by citation count and links to INSPIRE are provided.

PAPERS

2012 PRL (324): *"Evidence for a particle produced in association with weak bosons and decaying to a bottom-antibottom quark pair in Higgs boson searches at the Tevatron"*, CDF and D0 Collaborations, Phys.Rev.Lett. 109 (2012) 071804, arXiv:1207.6436, Tevatron comb. $h \to b\bar{b}$ channels full dataset.
2015 JHEP (228): *"Search for the $b\bar{b}$ decay of the Standard Model Higgs boson in associated $(W/Z)H$ production with the ATLAS detector"*, ATLAS Collaboration, JHEP 1501 (2015) 069, arXiv:1409.6212, ATLAS Run-1 VH with $h \to b\bar{b}$ paper. I was in ATLAS $m_{b\bar{b}}$ resolution task force.
2013 PRD (206): *"Higgs Boson Studies at the Tevatron"*, CDF and D0 Collaborations, Phys.Rev. D88 (2013) 5, 052014, arXiv:1303.6346,Tevatron comb. of all Higgs channels using all full dataset.
2017 JHEP (88): *"Evidence for the $H \to b\bar{b}$ decay with the ATLAS detector"*, ATLAS Collaboration, JHEP 1712 (2017) 0242, arXiv:1708.03299, ATLAS 15+16 evidence for SM $VH(bb)$.
2009 PRL (56): *"Search for a Higgs Boson in $WH \to l\nu b\bar{b}$ in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV"*, CDF Collaboration, Phys.Rev.Lett. 103 (2009) 101802, arXiv:0906.5613, CDF 2.7 fb^{-1} $WH \to l\nu b\bar{b}$.
2012 PRL (53): *"Combined search for the standard model Higgs boson decaying to a bb pair using the full CDF data set"*, CDF Collaboration, Phys.Rev.Lett. 109 (2012) 111802, arXiv:1207.1707.
2012 PRL (48): *"Search for the standard model Higgs boson decaying to a $b\bar{b}$ pair in events with one charged lepton and large missing transverse energy using the full CDF data set"*, CDF Collaboration, Phys. Rev. Lett. 109 (2012) 111804, arXiv:1207.1703, CDF full dataset $WH \to l\nu b\bar{b}$.
2013 PRD (45): *"Combination of Searches for the Higgs Boson Using the Full CDF Data Set"*, CDF Collaboration, Phys.Rev. D88 (2013) 5, 052013, arXiv:1301.6668, CDF comb. Higgs full dataset.
2016 PLB (44): *"Search for new resonances decaying to a W or Z boson and a Higgs boson in the*

$ll b\bar{b}$, $l\nu b\bar{b}$, and $\nu\nu b\bar{b}$ channels in pp collisions at $\sqrt{s}=13$ TeV with the ATLAS detector", ATLAS Collab., Physics Letters B 765 (2017) 32-52, arXiv:1607.05621, I developed the b-jet energy corrections.

2011 NIM (41): "Improved b-jet Energy Correction for $h \rightarrow b\bar{b}$ Searches at CDF", T. Aaltonen, A. Buzatu, B. Kilminster, Y. Nagai, W.-M. Yao, submitted to Nucl. Instrum. Meth. A, arXiv:1107.3026. Although not published by NIM, it received many citations as it pioneered b-jet-specific energy corrections in particle physics, a method commonly used in CMS and ATLAS nowadays.

2012 PRD (17): "Search for the standard model Higgs boson produced in association with a $W^{\pm}$ boson with 7.5 fb^{-1} integrated luminosity at CDF", CDF Collaboration, Phys. Rev. D86 (2012) 032011, arXiv:1206.5063, CDF $WH \rightarrow l\nu b\bar{b}$ with 7.5 fb^{-1}.

2017 JHEP (17): "Search for heavy resonances decaying into a W or Z boson and a Higgs boson in final states with leptons and b-jets in 36 fb^{-1} of $\sqrt{s}$=13 TeV pp collisions with the ATLAS detector", ATLAS Collaboration, JHEP 1803 (2018) 174, arXiv:1712.06518, ATLAS 15+16 BSM $A \rightarrow Zh(bb)$.

2018 PRL (7): "Search for the Decay of the Higgs Boson to Charm Quarks with the ATLAS Experiment", ATLAS Collaboration, Phys.Rev.Lett. 120 (2018) no.21, 211802, arXiv:1802.04329.

2018 PLB (6): "Search for a heavy Higgs boson decaying into a Z boson and another heavy Higgs boson in the $llbb$ final state in pp collisions at $\sqrt{s}$=13 TeV with the ATLAS detector", Physics Letters B 783 (2018) 392-414, arXiv:1804.01126, ATLAS 15+16 BSM $A \rightarrow ZH(bb)$, electroweak baryogenesis.

2013 NIM (6): "A Novel in situ Trigger Combination Method", A. Buzatu, A. Warburton, N. Krumnack, W.-M. Yao, Nucl. Instrum. Meth. A711 (2013) 111-120, arXiv:1206.4813. I was paper editor and developer of the new method used by all CDF searches in lepton+jets signature.

2012 PRD (4): "Search for Standard Model Higgs Boson Production in Association with a W Boson at CDF", CDF Collab., Phys. Rev. D85 (2012) 052002, arXiv:1112.1930, $WH \rightarrow l\nu b\bar{b}$ with 2.7 fb^{-1}.

2018 Submitted to JHEP (0): "Search for dark matter produced in association with a hadronically decaying vector boson and $E_{\mathrm{T}}^{\mathrm{miss}}$ in pp collisions at $\sqrt{s}$=13 TeV with the ATLAS detector", ATLAS Collaboration, Submitted to JHEP, arXiv:1807.11471, ATLAS 15+16 $V(qq)H(\text{invisible})$.

2018 Submitted to PLB (0): "Observation of $H \rightarrow b\bar{b}$ decays and VH production with the ATLAS detector", ATLAS Collaboration, Submitted to PLB, arXiv:1808.08238, ATLAS $H \rightarrow b\bar{b}$ observation.

CONFERENCE AND PUBLIC NOTES

2016 Aug. conference note (36): "Search for the Standard Model Higgs boson produced in association with a vector boson and decaying to a $b\bar{b}$ pair in pp collisions at 13 TeV using the ATLAS detector", ATLAS Collaboration, 2016, ATLAS-CONF-2016-091. I developed, validated and implemented the b-jet energy corrections. In addition, I contributed to CxAOD software, CxAOD production.

2016 Mar. conference note (34): "Search for a CP-odd Higgs boson decaying to Zh in pp collisions at $\sqrt{s}=13$ TeV with the ATLAS detector", ATLAS Collaboration, 2016, ATLAS-CONF-2016-015. I contributed to software, analysis optimisation and I developed the b-jet energy corrections.

CONFERENCES

2018 Nov: Higgs Couplings 2018, Japan, "Machine learning techniques for Higgs boson at the LHC".
2016 Aug: ICHEP 2016, Chicago, USA, "Run-2 VH(bb) Search in ATLAS", poster, proceeding.
2016 Jun: HSQCD 2016, St Petersburg, Russia, "Latest ATLAS Higgs Physics results", talk, talk.
2016 Mar: LHCC 2016, CERN, "ATLAS boosted hadronic object reconstruction", poster.
2016 Jan: ZPW 2016, Zurich, Switzerland, "VH & VBF Higgs ATLAS & CMS searches", talk.
2013 Oct: CHEP 2013, Amsterdam, "Real-time b-jet identification in ATLAS", poster, proceedings.
2011 Jul: Higgs Hunting 2011, Orsay, France, "WH search at CDF", talk.
2011 Jul: EPS HEP 2011, Grenoble, France, "Combined Higgs searches at CDF", talk, proceedings.
2011: Fermilab Users Meeting, Batavia, USA, "$WH \rightarrow l\nu b\bar{b}$ at CDF", poster.
2011: Fermilab Users Meeting, Batavia, USA, "$WH \rightarrow l\nu b\bar{b}$ at CDF", poster.
2008: Hadron Collider Physics Symposium, Gallena, USA, "$WH \rightarrow l\nu b\bar{b}$ at CDF", poster.

OTHER ORAL PRESENTATIONS

2016: Romanian Diaspora Conference, Bucharest, Romania, Higgs boson search at the LHC.
2012: Romanian Diaspora Conference, Bucharest, Romania, Higgs boson search at the Tevatron.
2009: Canada-America-Mexico (CAM) Acapulco, Mexico, Physics Graduate Student Conference.
2005 - 2011: Seven presentations at the Canadian Association of Physicists (CAP) Congress.
2005 - 2015: Six presentations at the International Conference of Physics Students (ICPS).

OTHER POSTER PRESENTATIONS
2008 - 2011: Twice at the Fermilab Users Meeting, Batavia, IL, USA, presenting my PhD work on $WH \to l\nu b\bar{b}$ on behalf of the CDF collaboration.
2008: Hadron Collider Physics Symposium (HCPS), Gallena, IL, USA, $WH \to l\nu b\bar{b}$ at CDF.

INVITED SEMINARS
2016 Apr: Twice at Bucharest, Romania (ATLAS group of IFIN-HH and University of Bucharest).
2014 Oct: Twice at UFRJ, Rio de Janeiro, Brazil (Institutes of COPPE and IF).
2011 Oct: IFIN-HH, Bucharest, Romania.
2011 Sep: University of Glasgow, Glasgow, UK.

ATLAS POSTER PRESENTATIONS
2011 - 2016: Many presentations at ATLAS weeks, workshops, group meetings, *etc.*, for example:
2016 Jan: ATLAS UK Annual meeting, Sheffield, UK, b-jet energy corrections for $m_{b\bar{b}}$ in early Run II.
2015 Oct: ATLAS Week, Lecce, Italy, $h \to b\bar{b}$ tagger in early Run II.
2015 Apr: ATLAS Glasgow Funding Grant Review, ATLAS Run I VH(bb) search.
2015 Feb: ATLAS Week, CERN, Measuring b jets better, key to $WH \to l\nu b\bar{b}$.
2015 Feb: ATLAS Week, CERN, Measuring b jets better with neural networks.
2014 Jun: ATLAS Week, Sibiu, Romania, Measuring jets better, key to finding $h \to b\bar{b}$.

SUMMER SCHOOLS
2012 - 2016: Five participations at Young Experimentalists and Theorists Institute, Durham, UK
2012: Scottish Universities Summer School in Physics, St Andrews, Scotland
2011: CERN-Fermilab Collider Physics Summer School, CERN
2008: Florida International Grid Computing School, Miami, USA

RESEARCH SUPERVISION
2017 - 2018: One PhD student at Academia Sinica.
2014-2016: Informal supervision of two MSc and four undergraduate students from Rio de Janeiro.
2016: One summer student with Nuffield fellowship at ATLAS project at University of Glasgow.
2015: One student in fourth year for one semester ATLAS project at University of Glasgow.
2013 - 2015: Two PhD students on ATLAS at University of Glasgow.
2013: Four students in third year for ATLAS summer projects at University of Glasgow.
2012: One high school student for ATLAS summer project, Nuffield Fellowship, at Uni. of Glasgow.

INTERNATIONAL COLLABORATION
ATLAS group of Federal University of Rio de Janeiro, Brazil. Two years ago, during a 5 week EPLANET visit to Rio in Oct 2014, I helped the group join the b-jet energy correction development effort in ATLAS, and continued the collaboration and supervision of their $h \to b\bar{b}$ work ever since.

TEACHING EXPERIENCE
Research-driven teaching experience as research associate and teaching assistant:

Teaching and developing curriculum for four years at the University of Glasgow for graduate students from across universities in Scotland, for scientific computing labs (C++, ROOT).

Teaching and developing curriculum for four years at the University of Glasgow for third year undergraduate students to simulate numerical solutions for classical field theory.

Teaching physics skills for first year students for one year at the University of Glasgow.

Teaching mechanics and electromagnetism laboratories for undergraduates at McGill University.

Teaching tutorials for two different courses at McGill University.

Assessing and marking homework and exams for undergraduates for four years at McGill University.

Private tutoring for physics and maths courses for 10 years for high school and undergraduate students.

ATLAS INTERNAL NOTES

A recent selection is presented below in inverse chronological order:

2018 May: *"Object Definitions and Selections for Standard Model $VH \to ll/l\nu/\nu\nu + b\bar{b}$ Analysis*, ATL-COM-PHYS-2018-517, 2 authors.

2018 May: *"Search for the Standard Model Higgs boson produced in association with a vector boson and decaying to a pair of b-quarks"*, ATL-COM-PHYS-2018-512, 74 authors.

2017 July: *"Search for the decay of the Higgs boson to charm quarks with the ATLAS experiment"*, ATL-COM-PHYS-2017-1053, 15 authors.

2017 May: *"Search for heavy resonances decaying into a W or Z boson and a Higgs boson in final states with leptons and b-jets in 36 fb^{-1}1 of $\sqrt{s}$=13 TeV pp collisions with the ATLAS detector"*, ATL-COM-PHYS-2017-023, 39 authors.

2016 Dec: *"Search for $H \to c\bar{c}$ decays in associated ZH production"*, ATL-COM-PHYS-2016-1753, 15 authors.

2016 Nov: *"Search for a heavy CP-odd Higgs Boson decaying to a Z boson and a heavy CP-even Higgs boson H with $A \to ZH \to llbb$ produced in 13 TeV Collisions with the ATLAS Detector"*, ATL-COM-PHYS-2016-1737, 16 authors.

2016 Nov: *"Hbb Vh to bb 2015+2016"*, HIGG-2016-29, paper to be submitted soon.

2016 Nov: *"Object selections for SM Higgs boson produced in association with a vector boson in which $H \to b\bar{b}$ and V decays leptonically with Run-2 data: Object support note for $VH(b\bar{b})$ 2015+2016 dataset publication"*, ATL-COM-PHYS-2016-1674, 2 authors, co-editor of the object reconstruction support note for four analyses: SM $VH(b\bar{b})$, $VH(c\bar{c})$ and BSM AZH and AZh.

2016 Nov: *"Search for a heavy CP-odd Higgs Boson decaying to a Z boson and a heavy CP-even Higgs boson H with $A \to ZH \to llb\bar{b}$ produced in 13 TeV Collisions with the ATLAS Detector"*, ATL-COM-PHYS-2016-1737, 15 authors, I derived the b-jet energy corrections for heavy H.

2016 Oct: *"Search for Dark Matter in association with a hadronically decaying vector boson in pp collisions at $\sqrt{s} = 13$ TeV using 2015+2016 data collected with the ATLAS detector"*, ATL-COM-PHYS-2016-1499, 26 authors.

2016 Oct: *"Study of the neutrino based b-jet energy correction, to improve the di-b-jet invariant mass ($m_{b\bar{b}}$) reconstruction, which would improve the sensitivity for searches with $h \to b\bar{b}$"*, ATL-COM-PHYS-2016-1446, 3 authors, I provided the project idea, the ROOT flat ntuples, and supervised the day to day work of the undergraduate student, Fergus.

2016 May: *"Search for a Standard Model Higgs boson produced in association with a vector boson and decaying to a pair of b-quarks"*, ATL-COM-PHYS-2016-429, 53 authors, main internal note.

2016 May: *"Object selections for analyses involving a Higgs boson produced in association with a vector boson in which $h \to b\bar{b}$ and V decays leptonically with Run-2 data collected with the ATLAS detector at $\sqrt{s} = 13$ TeV"*, ATL-COM-PHYS-2016-480, 53 authors, object selection support note.

2016 May: *"Theoretical studies for the Standard Model VH with $h \to b\bar{b}$ and related searches - Supporting Document"*, ATL-COM-PHYS-2016-475, 53 authors, MC simulation support note.

2016 Feb: *"Search for new resonances decaying to a W or Z boson and a Higgs boson in the $llb\bar{b}$, $l\nu b\bar{b}$, and $\nu\nu b\bar{b}$ channels in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector"*, ATL-COM-PHYS-2016-094, 44 authors, paper draft, improved jet mass resolution by correcting b-jet energy for muons.

2016 Jan: *"Decoupled b-jet-energy corrections (muon-in-jet, neutrino-in-jet, and transverse momentum) for $h \to b\bar{b}$ searches for ATLAS in early Run II"*, ATL-COM-PHYS-2016-035, 1 author.

2016 Jan: *"Supporting Note for the 2HDM Higgs $A \to ZH$, $h \to b\bar{b}$ searches"*, ATL-COM-PHYS-2016-030, 44 authors, main support note for the $A \to ZH$ search for Moriond 2016.

2015 Dec: *"Object selections for the SM VH and $A \to Zh$, search with V decaying leptonically and $h \to b\bar{b}$ with Run-2 data collected with the ATLAS detector at $\sqrt{s} = 13$ TeV - Supporting Document"*, ATL-COM-PHYS-2015-1467, 44 authors, object recontruction support note for the $A \to ZH$ search for Moriond 2016, I edited large parts of the jet section and fully the appendices on the muon-in-jet and PtReco corrections derivations in Run II, and their performance in the $A \to Zh$ analysis.

2015 Jul: *"Tagging boosted $h \to b\bar{b}$ bosons in ATLAS in early Run-II"*, ATL-COM-PHYS-2015-639, 17 authors, edited appendix I, derived μ- and ν-in-jet energy corrections.

2015 Jan: *"Impact of jet-energy corrections on the ATLAS Run I $WH \to l\nu b\bar{b}$ search"*, ATL-PHYS-INT-2015-004, 9 authors, note editor, led the effort, contributed 70% of the total work, with an extended selection of validation plots in another note, ATL-PHYS-INT-2015-003

2012 Oct: *"Invariant Mass Studies for the $h \to b\bar{b}$ Measurements for HCP"*, ATL-COM-PHYS-2012-1451, 20 authors, the efforts of the $m_{b\bar{b}}$ resolution improvement task force.

ATLAS ORAL PRESENTATIONS

2011 - 2016: Many presentations at ATLAS weeks, workshops, group meetings, *etc.*, for example:

2018 Jul: ATLAS ASG, CxAOD framework review and discussion on CP algorithms

2018 Mar: ATLAS DBL Jamboree, SM $VH(bb)$ checks of CxAOD in Release 21 software.

2018 Feb: ATLAS P&P week, $VH(bb)$ status and high pile-up studies.

2018 Jan: ATLAS V(qq)H(invisible) EB, $H \to$ invisible new signals direct vs truth tagging.

2017 Sept: ATLAS V(qq)H(invisible) EB, Reinterpreting mono-V to $H \to$ invisible.

2017 Sept: ATLAS $H(bb)/b$-tagging workshop, b-jet energy corrections - Status and plans.

2017 July: ATLAS SM VH(cc) EB, Update on bkg. modelling uncertainties: first and second talk.

2017 Mar: ATLAS AZH analysis, PtReco b-jet correction trained for $A \to ZH \to llb\bar{b}$.

2017 Mar: ATLAS VH(cc), Limits with c-jet energy corrections in SM $VH(cc)$ search.

2017 Mar: ATLAS HBSM meeting, Status update of $A \to Zh$ search.

2017 Feb: ATLAS JES/JER meeting, Update on b-jet energy corrections.

2017 Feb: ATLAS AZH analysis, PtReco b-jet correction trained for $A \to ZH \to llb\bar{b}$.

2016 Sep: ATLAS JetEtMiss workshop, Corfu, MC-based b-jet energy corrections in Run-2.

2016 Apr: ATLAS invited seminar at University of Bucharest Hbb searches in ATLAS.

2016 Mar: ATLAS Hbb workshop, London, talks on b-jet energy corrections and overlap removal.

2015 Dec: ATLAS Hbb group, PtReco for Run II, derivation, summary, performance.

2015 Sep: ATLAS JetEtMiss Workshop, Bratislava, talks on large-R and regular-R jet mass resolution.

2015 July: ATLAS $X(bb)$ tagging, Lepton-in-jet corrections for Boosted $H \to b\bar{b}$.

2015 Jun: ATLAS UK Higgs Workshop, b-jet energy corrections for SM and BSM $h \to b\bar{b}$ analyses.

2014 Nov: ATLAS Brazil workshop, ATLAS $VH(b\bar{b})$ search in ATLAS Run I data.

2014 Mar: ATLAS Trigger Workshop, Lisbon, contributed material to summary talk on b-jet triggers.

2013 Sep: Glasgow PPE Review, Jet energy corrections using neural networks for ATLAS $h \to b\bar{b}$.

2013 Aug: ATLAS Flavor Tagging Workshop, Stockholm, talk on b-jet trigger.

2012 Oct: ATLAS UK HLT Workshop, talk on Status on b-jet triggers.

DOCTORAL RESEARCH

2007 - 2011: Developed a novel trigger combination method for CDF $WH \to l\nu b\bar{b}$ **search.**

Context: The search sensitivity is improved by adding a category of charged leptons reconstructed with less stringent criteria. Three triggers based on $E_{\mathrm{T}}^{\mathrm{miss}}$+jets, orthogonal to the standard charged-lepton triggers, are available with efficiencies varying in different regions of the $E_{\mathrm{T}}^{\mathrm{miss}}$ and jet phase space.

Goal: Combine these triggers to maximise efficiency, while avoiding the logical OR, which introduces correlations and requires considering new systematic uncertainties that can shadow potential gains.

Task: Compute the efficiencies of the three triggers. Develop a novel trigger combination method of any number of triggers per-event (*in situ*). Code in its own software package. Apply to the analysis.

Result: 33% gain in signal acceptance & 17% gain in sensitivity. My method was published in NIM.

2010 - 2011: Data analysis software framework in CDF $WH \to l\nu b\bar{b}$ **search.**

Context: We want to perform multiple analyses in the lepton plus jets sample (Higgs, single top, technicolor searches, *etc.*) and to allow the addition of analysis improvements as new charged lepton, b-tagging, jet multiplicity categories, or multi-jet rejection methods.

Goal: Create a new improved generic C++ data analysis software framework.

Task: Co-develop and validate in the $WH \to l\nu b\bar{b}$ search a software package that reads a raw CDF file and produce a ROOT tuple file. From it create histograms, plots and web pages.

Result: Achieved. The $WH \to l\nu b\bar{b}$ search limit is the world's best at the time from all $H \to b\bar{b}$ searches. The framework was used successfully for the other searches as well.

MASTER RESEARCH

2006: Primary vertex reconstruction in CDF $t\bar{t}$ **lepton plus jets sample.**

Context: During a proton-proton bunch crossing there are several proton-proton interactions.

Goal: Identify the one which contains a massive interesting particle, such as a W, Z, Higgs boson.

Task: Evaluate three primary vertex (PV) reconstruction algorithms, relative to the generated PV.

Result: No significant difference between the PV with the largest sum of transverse momenta of tracks and the one closest in z to the charged lepton. A combination of the two also doesn't differ.

UNDERGRADUATE RESEARCH

2004 - 2004: Scintillator crystal calorimeter in E391a experiment at KEK, Japan.
Context: E391a is fixed target experiment that searches for rare kaon decays.
Goal: Decide whether to replace the CsI scintillator crystal calorimeter with a $PbWO_3$ one.
Task: Read publications on $PbWO_3$ and summarise its calorimeter properties.
Result: Achieved. The CsI is maintained for the Run II upgrade, as seen in arXiv:0712.4164.

COMPUTER SKILLS

Used: C++, Python, Bash, (Py)ROOT, SVN, GIT, RIVET, YODA, HTML, PHP, Grid, MySQL.
Co-developer: Complex data analysis software frameworks at CDF (WHAM) and ATLAS (CxAOD).
Sole developer: Software package to combine trigger efficiencies using a novel method at CDF.
Sole developer: Data analysis software framework for scale/resolution studies at ATLAS.
Sole developer: Generic data analysis software packages (plotting tools, statistical analysis).
Expertise: Understand non-documented code and refactor to incorporate new features.
Expertise: Identify redundant steps and redesign the workflow for speed up.
Expertise: Automate steps needed by hand, to work out of the box for all user cases.
Expertise: Implement rigorous testing of code both locally and in Continuous Integration in GitLab.
Expertise: Document code and instructions and train young students to produce physics results fast.
Expertise: Project management of international team through the entire life cycle: design to usage.

ADMINISTRATIVE SKILLS

2016 - present: Editor for Advances in High Energy Physics and Journal of Particle Physics.
2012 - 2016: Recruit undergraduate students for Glasgow HEP experimental summer internships.

LEADERSHIP SKILLS

2007 - 2011: Graduate Student Representative in the Canadian Association of Physicists Council.
2007: Head local organiser for Canada-America-Mexico 2007 physics graduate student conference.
2005 - 2011: Founder and coordinator of the science outreach website in Romania www.StiintaAzi.ro.

MEMBERSHIP

2005 - 2010: Canadian Association of Physicists (CAP).
2011 - 2015: International Association of Physics Students (IAPS).

OUTREACH EXPERIENCE

I am passionate about science outreach, as seen at adrianbuzatu.com, for example:
July 2017: CERN's stand at the Nuit de la science, Geneva: programming robots for children.
Nov 2017: CERN's stand at the Automnales exhibition, Geneva: programming robots for children.
Oct 2017: CERN's contribution at the Codez la science, Geneva: programming robots for children.
Numerous outreach talks about particle physics and the Higgs boson for the general public, university students and high school students. For example, for the public at JCI Craiova, TechHub Romania, TEDxBucharest, TEDxUniversityOfGlasgow, Pint of Science Glasgow, Explorathon Glasgow, for students at Glasgow Masterclass, the University of Bucharest twice, the International Conference of Physics Students five times, also at about 25 high schools in Romania and Moldova.
ATLAS masterclasses at Glagsow in English and one at CERN in French.
March 2016 participating at the UK outreach event I'm a scientist, get me out of here.
About 20 interviews in Romanian media in print, TV and radio (link).
About 50 outreach articles in Romanian media (link); one review in the Glasgow GIST magazine.
Manned booths for CERN and Glasgow Open Days, Particle Physics for Scottish Schools.
2012 - 2014: Mentor and judge for the project TechSchool.ro in Romania.
2007 - 2009: Many visits to primary schools in Montreal for hands-on science experiments.

2007 - 2011: Graduate Student Representative in the Canadian Association of Physicists Council.
2007: Head local organiser for Canada-America-Mexico 2007 physics graduate student conference.
2005 - 2011: Founder and coordinator of the science outreach website in Romania www.StiintaAzi.ro.

LANGUAGES

Proficient: English, French.
Reading some basic: German, Spanish, Portuguese.
Native: Romanian.

OTHER SKILLS

Student supervision: At McGill one summer student. At Glasgow two PhD students and six summer students. De-facto supervisor of two masters and four undergraduate students from Rio de Janeiro.
Editor for HEP journals: Advances in High Energy Physics and Journal of Particle Physics.
Teaching: Track record of research-lead teaching, at both undergraduate and graduate level, at both McGill and Glasgow universities, including syllabus design (numerical methods, C++ and ROOT).
Recruitment: undergraduate research students in HEP at the University of Glasgow.
Leadership: Graduate Student Representative, Canadian Association of Physicists, 2007-2011.
Conference organiser: Canada-America-Mexico CAM 2007 physics graduate student conference.
International experience: adapt easily to new cultures. Work both in large teams, and independently.

TRAINING I RECEIVED AT GLASGOW

2016: Supervising PhD students.
2016: Recruiting and apply for funding for PhD students.
2016: Applying for academic jobs and preparing a CV.
2015: Aspiring Principal Investigator (how to apply for research grants).
2014: Software tutorials at CERN on ATHENA, C++, xAOD.
2014: Working internationally.
2013: Communicating effectively with your staff.
2013: Coaching and facilitation skills for line managers.
2013: Constructive feedback and challenging conversations for reviewers.
2013: Understanding people.

HOBBIES

Traveling, exploring new cultures, history, biking.

PERSONAL INFORMATION

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