

Somadutta Bhatta

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ABOUT ME

After having experience with various data analysis methods and simulation frameworks in EHEP, in my graduate studies in physics, currently my PHD interest is “Flow and Flow Fluctuations”.

I am currently working on measurement of correlations and cumulants to understand the properties of the medium formed in different heavy ion collision systems at ATLAS, CERN. I am also involved with STAR experiment at BNL.

In addition, I am working on improving Minimum Bias triggers to match modern computational architecture of multi-threading which will greatly benefit the data taking process of LHC Run-3 in terms of memory space and the time overheads. We have made a priority list of all the triggers in the trigger list for the latest ATLAS Run and we aim to upgrade them all to make them more efficient under the upcoming framework.

My professional ambition is to pursue a career in research in this field as a teaching faculty in the academia.

EDUCATION

Stony Brook university, Stony Brook, USA,

- PhD Student working on Relativistic Heavy Ion Physics. Aug 2018 – current
 - Working on Flow Correlations and Fluctuations.
In addition to the analysis I am also involved with Software upgrade for MinBias trigger systems at ATLAS, CERN.
 - **Advisor:** Prof. Jiangyong Jia
 - **Focus:** Correlations, Fluctuations, Bulk medium properties,

Demonstration Multipurpose School, RIE, Bhubaneswar, India

All India Senior School Certificate Examination(class 12th/10+2) in Science.

National Institute of Science Education and Research (NISER), India,

- B.Sc-M.Sc dual degree in Physical Science Aug 2013 – May 2018
 - **M.Sc Thesis:** Understanding the mechanism of particle production in high energy heavy-ion(Au+Au) collisions at $\sqrt{s_{NN}} = 200$ GeV
 - **Advisor:** Prof. Bedangadas Mohanty
 - **Focus:** Heavy Ion Collision, QGP, Spectator Neutrons distribution, substructures in centrality classes, Elliptic flow.
 - Cumulative GPA: 8.04 / 10.0

Demonstration Multipurpose School, RIE, Bhubaneswar, India

All India Senior School Certificate Examination(class 12th/10+2) in Science.

Graduated in May 2013 with 90.2% marks.

Demonstration Multipurpose School, RIE, Bhubaneswar, India

All India Secondary School Examination(class 10th)

Graduated in May 2013 with 10/10 CGPA.

RESEARCH EXPERIENCE

National Institute of Science Education and Research (NISER),

- Summer Internship , Particle Physics Dec 2013 – Dec 2013
 - **Project:** “Neutrino Oscillation in vacuum”
 - **Supervisor:** Prof. Sanjay Swain
 - **Focus:** Introduction to particle physics, Two flavored Neutrino Oscillations. Mass and Flavour eigen states were studied on and probability vs L plots were plotted for narrow and wide Energy distribution of source neutrinos.

Homi Bhabha Centre for Science Education, TIFR,

- 2 year project , Particle Physics Jun 2014 – Dec 2015
 - **Project:** “Solar and Reactor neutrino oscillations”
 - **Supervisor:** Prof D.P Roy
 - **Focus:** After introduction on Three neutrino oscillations, we discussed on MSW effect, LMA, SMA, LOW and VAC solutions, sharpening of the LMA solution by KamLAND, Third mixing angle, CP violating phase, the role of experiments in pinpointing neutrino oscillation parameters, current problems, and future directions.

National Institute of Science Education and Research (NISER),

- Semester Project , Experimental High Energy Physics Jan 2015 – May 2015
 - **Project:**“Study of elliptic flow of light nuclei using Coalescence method”
 - **Supervisor:**Prof. Bedangadas Mohanty
 - **Focus:** I did studies on QCD, QGP, QGP signatures and Kinematic variables in Heavy ion collisions I plotted those kinematic variables for AMPT generated data for Au+Au collisions at 62.4 GeV.I did calculation and analysis of Elliptic Flow Coefficients, Coalescence Model and showed Mass Scaling and Mass Ordering for different transverse momentum ranges thus obtaining an insight of particle production process in high energy Heavy Ion Collisions.The analysis was done using ROOT.

Tata Institute of Fundamental Research (TIFR),

- VSRP summer Project , Experimental High Energy Physics May 2016 – Jul 2016
 - **Project:**“An optimised technique to extract single Top events at CMS”
 - **Supervisor:** Prof. Gagan B. Mohanty
 - **Focus:** The project was ”An optimized technique to extract single Top events at CMS”.Top Quark production Channels at CMS was studied, Multivariate Analysis, Artificial Neural Networks, Boosted Decision Trees were used in TMVA package in ROOT to select suitable variables for the best Background separation.

Saha Institute of Nuclear Physics,

- summer Project , Experimental High Energy Physics May 2017 – Jul 2017
 - **Project:** “Simulation of Gaseous Detectors”
 - **Supervisor:** Prof. Supratik Mukhopadhyay
 - **Focus:** The project was on ”Simulation of gaseous detectors”. RPCs and GEMs of varying geometry and configurations was simulated using Garfield++, the properties of the gas medium used was determines using Magboltz++ and HEED. The Boltzmann Equation and Finite Element Method(FEM) was studied and FEM was implemented manually for RPC using C++ code.Clusters and avalanche informations, field configurations, gain distributions and signal were obtained from the simulated RPCs and GEMs.

PUBLICATIONS

JOURNALS

- [1] Sarthak Mohapatra, Somadutta Bhatta, and Pravakar Pradhan, [Study of Temperature and Concentration Dependence of Refractive Index of Various Liquids using a simple technique of LASER](#) *Student Journal of Physics (by IAPT)*, vol. 5, no. 4, pp. 339–350, Jun 2016.

TRAINING PROGRAMMES, SEMINARS, CONFERENCES ATTENDED

- 1) ATLAS HLT Upgrade Hackathon (@ CERN)
Participated in the workshop and High Level Trigger(HLT) Hackathon sessions leading to understanding of HLT structure and the process of migrating it to Athena-MT Framework.
Jun 2019
- 2) Junior Mathematics Olympiad Camp
A camp for Intensive Mathematics discussions and interactions for Olympiads for 15 days period.
May 2009
- 3) Annual National Science (Vijyoshi) Camp
Annual National Science (Vijyoshi) Camps provide a forum for interactions between bright young students and leading researchers in various branches of science and mathematics
Nov 2014
- 4) National Initiative on Undergraduate Science(NIUS) Physics Camp
Got selected to attend NIUS Programme and got selected to conduct a reading project of duration of 2 years on ”Solar and Reactor Neutrino oscillations”. Attended several lectures on advanced fields of science.
2014 – 2015
- 5) Visiting Student’s Research programme(VSRP)-2016
Selected to attend VSRP at TIFR, Mumbai. Alongwith the project on TMVA, regular lectures on various advanced fields of research were held.
May 2016 – Jul 2016
- 6) CSIR Programme on Youth For Leadership In Science
The lectures and talks conveyed how diverse,interesting and promising can science be for young generations and why more of the youth should be doing science.
Dec 2011

- 7) UTSE(Uranium talent search exam) camp
A seven day camp involving regular classes on advanced physics and chemistry lectures and discussions and attended by 50 top performers in the UTSE exam.
2013

TALKS & PRESENTATIONS

- Talks at HBCSE, Tata Institute of Fundamental Research, on understanding of Neutrino Oscillations
- Presented a talk on my work on "Application of Multi Variate Analysis for signal extraction at CMS" at Tata Institute of Fundamental Research, Mumbai.
- Poster presentation on "Study of elliptic flow of light nuclei using Coalescence method" at National Institute of Science Education and Research.
- Project talk on "Simulation of Gaseous Detectors" at Saha Institute of Nuclear Physics, Kolkata.
- Thesis presentation on "Understanding the mechanism of particle production in high energy heavy-ion collisions" at National Institute of Science Education and Research, Bhubaneswar.

QUALIFYING EXAM SCORES

GRE (PHYSICS),

- Score: 940 / 990

GRE (general),

- Score: 322 / 340 [169 / 170(Quantitative), 153 / 170(verbal)]

TOEFL(iBT) ,

- Score: 102 / 120 [reading: 28 / 30, listening: 25 / 30, speaking: 20 / 30, writing: 29 / 30].

AWARDS & SCHOLARSHIPS

- INSPIRE(Innovation in Science Pursuit for Inspired Research) scholarship 2013-2018
For securing All India Rank 195 in National Entrance Screening Test (NEST)
- CSIR-NET JRF-LS (Physics) All India Rank - 39. 2018
- GATE (Physics) All India Rank - 141. 2018
- Best Project student in Department of High Energy Physics for VSRP from TIFR, Mumbai, India. 2016
For the Best Summer Project in TIFR, India
- National Initiative on Undergraduate Science(NIUS) Scholar. 2014-2015
- All India Rank-5 on the National entrance exam for RESONANCE. 2012
- KVPY (Kishore Vaigyanik Protshahan Yojana) 2012
Qualified the written round of the toughest National Exam in 10+1 level
- 15 th National science Olympiad(SOF)- All India Rank-23 2012
- National Mathematics Olympiad- FIRST PRIZE-100% scored-Awarded Gold Medal 2012
- CBSE science exhibition 2011
Selected for National level CBSE science exhibition for my working model on "Efficient green energy production in coastal regions" including modified wind-mill blade designs and nano-dots.
- All India Rank - 4 in National Science Proficiency Test organized by Career Point. 2011
- 100% scorer in National Mathematics Olympiad and awarded Gold medal, conducted by AISMTA. 2010
- National Talent Search Examination (NTSE) Scholarship 2009 – 2013
For Qualifying the toughest National Exam at 8th Grade level
- JMO(Junior Maths Olympiad) Qualified-24th Rank 2009
- All India Rank - 2 in Green Olympiad [organised by: Ministry of Environment Forest, Govt. of India.] 2008

LANGUAGES

- English: Daily Use (speaking, reading, writing).
- Hindi: Fluent (speaking, reading, writing).

SKILLS

Proficient in

$\text{T}_\text{E}\text{X}$, $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$, ROOT, C++, Python(Basics), Garfield++, TMVA, Origin, MATLAB, Mathematica, GnuPlot, Linux.

INTERESTS

Coding,

Designing experimental setups for conducting new experiments.

Volleyball (have won many championships at intercollege and State level)

Singing (was a child artist for All India Radio),

Listening to Music.

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