

# DAMODAR RAJBHANDARI

Aspirant: Physicist, Scientific Programmer & Blogger

DOB: 1996-Nov-08, Citizenship: Nepali



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## PROJECTS

### Researcher & Scientific Programmer

An Open Source for Causal Dynamical Triangulations (CDT) Without Preferred Foliation in (1+1)-Dimensions with Elementary Expositions

📅 Aug 2017 – July 2018

📍 St. Xavier's College, Nepal

Supervisors: Prof. Dr. Udayaraj Khanal & Dr. Jonah Maxwell Miller

- This is my under-graduate senior thesis.
- I have developed a new software toolkit for CDT without preferred foliation which will be freely available under the GNU public license and contribute to the open source community.
- I started this project with an ambition of rewriting the (1+1) dimensional CDT without preferred foliation code from scratch. This code will be further developed in near future to prove our hypothesis that geodesic distance will provide a meaning improvement to “jumping distance” used by spectral and Hausdorff dimension calculations, and short scale dimension reduction. This could be a tool for better understanding renormalization group flow in CDT.

Non-perturbative Quantum Gravity

Numerical Simulation

Sum Over Histories Line of Research

Reference:

<https://projects.physicslog.com/cdt-qg-2D/>

### Researcher & Scientific Programmer

A Short Visit to Ising's 2D Model

📅 Feb 2017

📍 St. Xavier's College, Nepal

Supervisors: Dr. Jonah Maxwell Miller

- I have implemented the Ising 2D model in python v3.5. with Object Oriented approach. And I consider, this is my first simulation project. In this work, my main contribution is the code optimization.
- I finished this simulation in the sense that I learned some basics of Monte-Carlo Simulation and achieved results that were comparable to Onsager's solution. After getting the data from simulation, I have presented all my results in a report “A short visit on Ising 2D model.
- I have also presented the poster of this work in “International Conference on Physics of Space and Materials (ICPSM 2017)”.
- This is actually my minor projects of CDT because in CDT, we convert our quantum field problem into statistical problem especially related to Ising model.

Spontaneous Magnetization

Numerical Simulation

Binder Cumulant

Monte-Carlo Simulation

Metropolis-Hastings Algorithm

Code Optimization

Reference:

<https://projects.physicslog.com/Ising-Model-in-2D/>

## KARMA PHILOSOPHY

*Invest your time in such a way that you won't feel you're wasting your time when you relax.*

📈 Research Gate Score: **1.01**

I believe my interests will furnish my scientific reputation.

## INTERESTS

General Relativity

Quantum Gravity

Causal Dynamical Triangulations

Quantum Field Theory

Astrophysics

Gravitation

Quantum Cosmology

Programming

Code Optimization

## LANGUAGES

Nepali

English

Hindi



## PROGRAMMING SKILLS

Python

LaTeX

Matlab

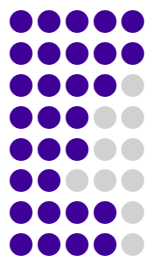
C++

R

Bash

Monte-Carlo Simulation

Object Oriented Design



## SOFTWARE EXPERTISE

Linux

Anaconda Package Manager

git

Sublime text-3

Kile

Textmaker

Lyx

emacs

Matlab

Geogebra

Eclipse

QtiPlot

gnuplot

Inkscape

R studio

Office

SPSS

## OTHERS SKILLS

Public Speaking

Poetry

Footballer

## Template Designer

### $\LaTeX$ Template for the Preparation of Bachelor's Project Proposal under Tribhuvan University Formatting.

📅 Oct 2017

📍 St. Xavier's College, Nepal

- I have made the template much clearer than the one which we can find in overleaf.

$\LaTeX$  Template

Report Format

Tribhuvan University

Reference:

[https://projects.physicslog.com/SXC\\_project\\_proposal/](https://projects.physicslog.com/SXC_project_proposal/)

## Programmer

### Optimizing the Equation Solver Code via Fixed Point Iteration Method

📅 Dec 2016

📍 St. Xavier's College, Nepal

- I have developed an optimized version of code for fixed point iteration method in Matlab.

Code Optimization

Equation solver

Reference:

<https://projects.physicslog.com/Fixed-Point-Iteration-Method/>

## SCHOLARLY WORKS

### 📄 Articles

- Rajbhandari, Damodar (2017e). "Detailed Derivation of 1+1 Dimensional Causal Dynamical Triangulations without Preferred Foliation". In: URL [https://www.researchgate.net/publication/320756192\\_Detailed\\_Derivation\\_of\\_11\\_Dimensional\\_Causal\\_Dynamical\\_Triangulations\\_without\\_PREFERRED\\_Foliation](https://www.researchgate.net/publication/320756192_Detailed_Derivation_of_11_Dimensional_Causal_Dynamical_Triangulations_without_PREFERRED_Foliation).
- "A Binomial theorem to derive the Taylor expansion in one variable". In: *The Winnower*. URL <https://thewinnower.com/papers/5453-a-binomial-theorem-to-derive-the-taylor-expansion-in-one-variable>.

### ✍️ Un-published articles

- Rajbhandari, Damodar (2016a). "An introduction to F-notation and the prove of the cartesian product of natural number is countably infinite". URL <http://vixra.org/abs/1611.0281>.
- (2016e). "Logical treatment for an oscillatory sequence 1, 2, 3, 4, 3, 2, 1, 2,.. to find any term and a computer program to assist the operation". URL <http://vixra.org/abs/1606.0034>.
- (2016f). "The premature state of "Topology" and "Graph Theory" nourished by "Seven bridges of Königsberg problem"". URL <http://vixra.org/abs/1609.0113>.

### 👥 Conference Proceedings & Posters

- Rajbhandari, Damodar (2017b). "A short visit to Ising's 2D model". In: *International Conference on Physics of Space and Materials (ICPSM 2017)*. URL [https://figshare.com/articles/Poster\\_A\\_Short\\_Visit\\_To\\_Ising\\_s\\_2D\\_Model/5369026](https://figshare.com/articles/Poster_A_Short_Visit_To_Ising_s_2D_Model/5369026).

## EDUCATION

Four years of B.Sc. in Physics

St. Xavier's College

📅 2014 - 2018

📍 Kathmandu, Nepal

- Affiliated to Tribhuvan University
- Secured **3.73/4.00 GPA** (via wes.org) equivalent to 70.73% in an aggregate of the first three years of B.Sc. in Physics
- Secured 82.4% in the fourth (final) year

## COMMUNITY ACTIVITIES

Certification of Participation- Workshop on Open Source Programming Language "R"

By Institute of Information & Technology Nepal

📅 Dec 15, 2017

📍 KTM, Nepal

Certification of Poster Presentation on "A Short Visit to Ising's 2D Model"- International Conference on Physics of Space and Materials (ICPSM 2017)

By St. Xavier's College

📅 Sep 2-3, 2017

📍 KTM, Nepal

Token of Love- Tutorial Session on "A Short Introduction to  $\LaTeX$  and its importance"

At St. Xavier's College

📅 July, 2017

📍 KTM, Nepal

Certification of Participation- National Workshop on New Research Trends in Physics

By St. Xavier's College

📅 Sep, 2016

📍 KTM, Nepal

Certification of Participation- School on Astronomy and Space Science

By B.P. Koirala Memorial Planetarium, Observatory and Science Museum Development Board, Government of Nepal

📅 Jun, 2016

📍 KTM, Nepal

## 📄 Reports

- Rajbhandari, Damodar (2017c). *A short visit to Ising's 2D model*. Tech. rep. URL [https://figshare.com/articles/A\\_short\\_visit\\_on\\_Ising\\_2D\\_Model/5143543](https://figshare.com/articles/A_short_visit_on_Ising_2D_Model/5143543). , St. Xavier's College, Nepal.

## TALKS

- Rajbhandari, Damodar (2017a). *A short introduction to  $\LaTeX$  and its importance*. URL <https://doi.org/10.6084/m9.figshare.5217613.v1>.
- – (2016c). *Introduction to Fixed Point Iteration Method and its application*. URL <https://doi.org/10.6084/m9.figshare.4285682.v1>.
- – (2018c). *An Open Source for Causal Dynamical Triangulations (CDT) Without Preferred Foliation in (1+1)-Dimensions with Elementary Expositions*. Research gate DOI: 10.13140/RG.2.2.17235.22563.

## CODE REPOSITORIES

- Rajbhandari, Damodar (2017d). *Beamer-like power-point template*. URL <https://github.com/Damicristi/Presentation-on-Reciprocal-Lattice>.
- – (2017f).  *$\LaTeX$  template for the preparation of bachelor's project proposal under Tribhuvan university formatting*. URL [https://github.com/Damicristi/SXC\\_project\\_proposal](https://github.com/Damicristi/SXC_project_proposal).
- – (2016b). *Fixed point iteration method implementation*. URL <https://github.com/Damicristi/Fixed-Point-Iteration-Method>.
- – (2017 –b). *An open source code for Causal Dynamical Triangulations without preferred foliation in (1+1)- dimensions*. URL <https://github.com/Damicristi/cdt-qg-2D>.
- – (2016d). *Ising 2D model simulator*. URL <https://github.com/Damicristi/Ising-Model-in-2D>.

## REFERENCES

### Prof. Dr. Udayaraj Khanal (Undergraduate Thesis Supervisor)

@ [khanalu@yahoo.com](mailto:khanalu@yahoo.com)

✉ Tribhuvan University, P.O. Box 44613, Kathmandu, Nepal

### Dr. Jonah Maxwell Miller (Undergraduate Thesis Supervisor)

@ [jonah.maxwell.miller@gmail.com](mailto:jonah.maxwell.miller@gmail.com)

✉ Los Alamos National Laboratory, MS-B214, P.O. Box 1663, Los Alamos, NM, 87545, USA

### Mr. Drabindra Pandit (HOD of Physics)

@ [pandit\\_drab@yahoo.com](mailto:pandit_drab@yahoo.com)

✉ St. Xavier's College, P.O. Box 7437 , Kathmandu, Nepal

## ORGANIZATIONS

### Editor

#### Journal of St. Xavier's Physics Council

📅 2017 – 2018

📍 Kathmandu, Nepal

- I was an active editorial member for the year (2017 – 2018) in the “Journal of St. Xavier's Physics Council”.
- This journal belongs to the category called as “Post-Publication Peer Review Journal”. Also, it is an overlay journal on viXra.

#### Reference:

<http://www.sxpc.ga/journal/>

### Editor

#### New Dimension Magazine

📅 Jan 2017 – Apr 2017 📍 Kathmandu, Nepal

- This magazine was a departmental magazine at St. Xavier's College.

### IT Officer

#### St. Xavier's Physics Council

📅 2016 – 2017

📍 Kathmandu, Nepal

- During the council, my job is to maintain the sxpc.ga site and other IT related works.

### Football Player U-14

#### All Nepal Football Association (ANFA), Kaski

📅 2008 – 2011

📍 Pokhara, Nepal

- Being in the club helped me to be a social and friendly person
- Praised as Best Player and Man of the Match in many tournaments
- To watch my Football skills, please go to [damodarrajbhandari.com.np/#hobbies](http://damodarrajbhandari.com.np/#hobbies)