

# Siba Smarak Panigrahi

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## Education

<b>M.Sc. (Thesis) in Computer Science</b> McGill University and Mila, Montréal, Canada (Supervisor: Siamak Ravanbakhsh)	<b>2022–Ongoing</b> GPA: 4.1/4.0
<b>B.Tech. in Computer Science and Engineering</b> Indian Institute of Technology, Kharagpur, India Department Rank 2 in graduating batch of CSE students (Supervisor: Abir Das, Rameswar Panda).	<b>2018–2022</b> GPA: 9.73/10
<b>All India Senior School Certificate Examination (AISSCE)</b> Kendriya Vidyalaya Sangathan (KVS), India Secured AIR 3, Rank 1 in Bhubaneswar Region. Among the top 0.1% of the 1.16 million candidates.	<b>2018</b> 98.6%

## Research Interests

Equivariant architectures (for images and graphs), Generative Models, Reinforcement Learning

## Research Experience

<b>Equivariant Pre-trained models through Canonicalization</b> Supervisor(s): Prof. Siamak Ravanbakhsh Implemented equivariant canonicalization functions to orient inputs before passing them through pre-trained models, effectively eliminating the requirement for designing and training extensive equivariant architectures from scratch.	<b>Mila and McGill University</b> Feb 2023 - Ongoing
<b>Visual Grounding in Textual Entailment</b> Bachelor's Dissertation   Supervisor(s): Prof. Abir Das, Dr. Rameswar Panda Investigated the effect of simultaneously and individually visual grounding the premise and hypothesis in NLI task. Trained various BERT configurations by leveraging high-level feature representations of image from ResNet-50 and CLIP.	<b>IIT Kharagpur</b> Jan 2022 - May 2022
<b>Contextual Bias in Visual Recognition Models</b> Supervisor(s): Prof. Abir Das, Dr. Rameswar Panda (MIT-IBM Watson AI Lab) Evaluated mAP and used GradCAM with state-of-the-art computer vision models to quantitatively and qualitatively determine the contextual bias in images containing exclusive and co-occurring biased pairs. Proposed different biased models to inherently capture contextual bias and knowledge distillation approaches for automated bias mitigation.	<b>IIT Kharagpur</b> Apr 2021 - Dec 2021
<b>Explanation Based Learning in Pretrained Language Models</b> IUSSTF-Viterbi Intern   Supervisor: Prof. Xiang Ren Worked on different attention-based regularization and knowledge-distillation techniques to analyze the effect of explanations generated using gradient-based saliency methods in the performance of Pre-trained Language Models.	<b>INK-Lab, USC</b> Jun 2021 - Sep 2021
<b>Improving Digital Marketing with Topological Data Analysis</b> Research Intern   Supervisor: Iftikhar Ahamath Burhanuddin Implemented Topological Regularization in LSTM Encoder-Decoder architecture to leverage the topological information from customer navigation patterns and obtain sessions' better latent representation to provide insights on sessions.	<b>Adobe Research, India</b> May 2021 - Jul 2021
<b>Emotion Recognition using EEG Signals</b> Research Intern   Supervisor(s): Prof. Arpit Bhardwaj, & Divya Acharya Carried literature reviews of recent papers to understand the basics of Genetic Programming and Multi-Task Cascaded Networks. Designed CNN-based and LSTM-based architectures to obtain <b>87.72%</b> and <b>88.6%</b> mean accuracy, respectively, for classification of EEG signals into valence, arousal, liking, and dominance.	<b>Bennett University, India</b> Jul 2020–Aug 2020

## Publications

- [5] **Equivariant Adaptation of Large Pre-Trained Models**  
A. K. Mondal\*, S. S. Panigrahi\*, S-O. Kaba, S. Rajeswar, S. Ravanbakhsh  
Conference on Neural Information Processing Systems (NeurIPS) 2023.
- [4] **Efficient Dynamics Modeling in Interactive Environments with Koopman Theory** ([Paper](#))  
A. K. Mondal, S. S. Panigrahi, S. Rajeswar, K. Siddiqi, S. Ravanbakhsh  
European Workshop on Reinforcement Learning (EWRL) 2023.

[3] **[Re]: Value Alignment Verification** ([Paper](#) | [Code](#))  
**S. S. Panigrahi\***, S. Patnaik\*  
*ML Reproducibility Challenge (MLRC) 2021; NeurIPS 2022 Spotlight and Journal Showcase Track.*

[2] **Leveraging Pre-trained Language Models for Key Point Matching** ([Paper](#) | [Code](#))  
M. N. Kapadnis\*, S. Patnaik\*, **S. S. Panigrahi\***, V. Madhavan\*, A. Nandy  
*EMNLP Workshop - Workshop on Argument Mining, 2021.*

[1] **Multi-class Emotion Classification Using EEG Signals** ([Paper](#) | [Code](#))  
D. Acharya, R. Jain, **S. S. Panigrahi**, R. Sahni, S. Jain, S. P. Deshmukh, A. Bhardwaj  
*International Advance Computing Conference (IACC), 2020.*

## Key Projects

**CausalBench: Inferring gene regulatory network with factor graphs** **McGill University and Mila**  
*Causal Inference and ML Course Project | Instructor: Prof. Dhanya Sridhar*

Studied the computational advantages and scalability potential of factor graphs in causal discovery ([DCD-FG](#)) for inferring Gene Regulatory Networks along with key factors such as sparsity regularization and the number of factors.

**Crystal Symmetry aware framework for Material Generation** **McGill University and Mila**  
*GGM Course Project | Instructor: Joey Bose and Prof. Prakash Panangaden*

Implemented equivariant message-passing and knowledge distillation in complex graph encoders (such as [DimeNet](#)) to incorporate crystal symmetry (Bravais lattice) information in [CDVAE](#) framework for material generation.

**Study of Facebook posts during Elections** **MIT, USA**  
*Data Analytics Intern | Supervisor(s): Dr. Kiran Garimella (IDSS, MIT)  
Prof. Aaditya Dar (ISB), & Vasundhara Sirnate (The Polis Project)*

Designed a complete framework to simplify the study of Facebook posts during elections. Analyzed page characteristics and post reactions from various politics-related Facebook pages and their correlation with election results. Trained simple classification pipelines for assigning the most influenced political party to a post. ([Code](#))

## Academic Achievements & Honors

- o **Google's CS Research Mentorship Program (CSRMP)** Class of 2023b (2023)
- o **CIFAR Deep Learning + Reinforcement Learning (DLRL) Summer School** (2023)
- o **The Cornell, Maryland, Max Planck Pre-doctoral Research School (CMMRS)** (2023)
- o **Oxford ML Summer School (OxML)** (Healthcare track) (2023)
- o **Jamsetji Nusserwanji Tata (JN Tata) Scholar** (endowment for higher studies) (2022)
- o **Eastern European Machine Learning (EEML) Summer School** (selected for poster presentation) (2022)
- o **PROSE, Microsoft Research** (winter research intern) (Jan - Jun 2022)
- o **Research Week with Google (Computer Vision track)** (1 of 150 selected students) (2022)
- o **Prof. J.C. Ghosh Memorial Endowment Prize** (highest CGPA after semester VI) (2021)
- o **Indo-US Science and Technology Forum (IUSSTF) - Viterbi Award** (1 of 15 awardees) (2021)
- o **DAAD-WISE scholarship, University of Freiburg** (declined) (2021)
- o **Inter IIT Tech Meet 9.0** (Bronze-winning contingent of IIT Kharagpur) (2021)
- o **Open IIT Maths Olympiad** (Team event; 1st position, Gold Medal) (2019)
- o **Technology Alumni Association (Delhi Chapter) Award** (highest CGPA after semester II) (2019)
- o **Jagadis Bose National Science Talent Search Examination** (Rank 2 of 173 awardees) (2018)
- o **Kishore Vaigyanik Protsahan Yojana** (All India Rank 828) (2017)
- o **Guest of the Hon'ble Prime Minister of India** to witness Republic Day Parade (2017)
- o **KVS Junior Mathematical Olympiad** (Rank 6 in India; Rank 1 in Bhubaneswar region) (2016)
- o **Regional Mathematical Olympiad** (Rank 2 in state) (2016)
- o **Exchange Student, Sakura Exchange Program in Science** (1 of 90 selected students) (2016)

## Relevant Coursework

**Mathematics** - Linear Algebra, Calculus, Probability, and Statistics

**Computer Science** - Causal Inference and ML, Geometry and Generative Models (GGM), Probabilistic Graphical Models, Network Science, Deep Learning, Machine Learning, Reinforcement Learning, Natural Language Processing (NLP), Information Retrieval, Principles of Programming Languages, Computer Networks\*, Operating Systems\*, Algorithms - I\* & II, Cryptography & Network Security, Theory of Computation, Compilers\*, Software Engineering\*  
(\* includes lab component)

## Skills

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- **Programming Languages** - Python, C, Java,  $\text{\LaTeX}$ , Verilog, MIPS
- **Libraries** - PyTorch, PyTorch Lightning, PyTorch Geometric, Gym, Keras, Huggingface, Timm, Hydra
- **Web Development** - Django, HTML, CSS, Bootstrap, PostgreSQL

## Activities and Leadership

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**Member, Mental Health Committee, Mila**

**Advisor, Kharagpur Data Analytics Group (KDAG), IIT Kharagpur** ([Reading-sessions](#))

**Advisor, Institute Wellness Group, IIT Kharagpur** ([Facebook](#))

**Head, Student Council, KV No.2 CRPF Campus, Bhubaneswar**

## Professional Services

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- **Organizing:** [Molecular ML Conference \(MoML\) 2023](#)
- **Volunteering:** [DNetCV 2022](#) (CVPR-W), EMNLP 2021
- **Reviewer:** MoML 2023, MLRC 2022 ([Outstanding Reviewer](#)), DNetCV 2022 (CVPR-W)
- **Posters/Talks:**
  - European Workshop on Reinforcement Learning (EWRL) 2023, VU Brussel (Poster, 2023)
  - NeurIPS 2022 Journal Showcase Track (and Spotlight lightning talks) (Poster & [Talk](#), 2022)
  - 50<sup>th</sup> Anniversary of School of Computer Science, McGill University (Poster, 2022)
  - KDAG Winter Workshop, lecture on Support Vector Machines ([Talk](#), 2020)