Pramit Biswas, *PhD*

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EXPERIENCE

Saankhya Labs (Tejas Networks)   Bangalore, KA, India / Kolkata, WB, India (WFH)
Senior Member Technical Staff   *Jul 2021-Present*

- Eurecom OpenAirInterface5g (OAI):
  - Working towards bringing execution and pipeline parallelism for the L1 process chain.
  - Made VNF/PNF (FAPI) work in OAI (NR).
- Intel FlexRAN:
  - Developed graph scheduling algorithms (C++) to allocate heterogeneous processing resources for FlexRAN. Developed auxiliary tools (Python) as required to support debugging and visual representation. Refactored existing codebase to support the plugging of various algorithms.
  - Created (proof-of-concept) end-to-end framework for provisioning DU in the cloud. Implemented communication using gRPC (C/C++/Python).
  - Created and maintained docker image, and GitLab CI pipeline.
- Part of WG1, WG6 (ORAN) from Saankhya to contribute towards future RAN.

PROGRAMMING SKILLS

CPLEX (daily driver in PhD for research); **Google OR-tools** (at Saankhya Labs); **MatLab** (daily driver in M.Tech and PhD for research); **Simulink** (used for hobby projects and M.Tech research); **Python** (used to develop reinforcement learning algorithm in PhD, frequently use for website scraping, scripting, data-analysis and personal finance); **Latex** (use for medium to large document preparation); **C**, **C++** and **Assembly** (used in embedded projects and at Saankhya Labs); **HTML**, **CSS** and **JS** (used for hobby projects and www.iitp.ac.in/ieeesb website)

EDUCATION

- **Indian Institute of Technology Patna** | 2021
  PhD in Electrical Engineering
  Visiting scholar at GSSST, **Indian Institute of Technology Kharagpur**
  Research Topic: Energy-efficient IP-over-Elastic Optical Network Planning and Operation Strategies

- **Rajabazar Science College** | **University of Calcutta** | 2014
  M.Tech. in Electrical Engineering | CGPA: 8.4 (out of 10)
  Research Topic: Stochastic Optimization-based Parameter Estimation and Design of PID Controller for Twin Rotor MIMO System

- **Kalyani Government Engineering College** | **West Bengal University of Technology** | 2012
  B.Tech. in Electrical Engineering | DGPA: 8.06 (out of 10)
  Project Topic: Processor-based Temperature Controller

SCHOLARSHIPS

- **Visvesvaraya** PhD Fellowship, *MeitY, Govt. of India* (25% more fellowship amount than most of the other PhD Schemes)
- MHRD GATE

PARTICIPATION

Organized and participated in several seminars, workshops, technical and non-technical events.
Volunteered as **Chair** at **IIT Patna IEEE Student Branch**.

AREAS OF INTEREST

Optimization heuristics and programming formulation | Machine learning | Optical Backbone Network | 5G/B5G Wireless-Optical Network | IoT/UAV/Drone Networks | Network automation: SDR, SDN, YANG, NETCONF, RESTCONF, NFV | micro-services | System automation | High-performance computing (HPC) | Quantum optimization.

PUBLICATIONS

- **Patent**
  - Cloud Native Microservices Framework for RAN (Provisional Specification), India, Provisional Patent Application No.: 202241073080, Saankhya Labs, Dec 16, 2022.
- **Journal**
  - **Pramit Biswas**, Md Shahbaz Akhtar, Sriparna Saha, Sudhan Majhi, and Aneek Adhya, "Q-Learning Based Energy-Efficient Network Planning in IP-over-EON", *IEEE Transactions on Network and Service Management*, 2022, 10.1109/TNSM.2022.3197329.
  - **Pramit Biswas**, Satyajit Das, Debashree Guha and Aneek Adhya, "Wavelength-routed Optical Backbone Network Planning Under Fuzzy Environment", *Optical and Quantum Electronics*, Springer, 54 (2022), pp.1-17.
  - **Pramit Biswas**, and Aneek Adhya, "Energy-Efficient, EDFA Lifetime-Aware Network Planning along with Virtualized Elastic Regenerator Placement for IP-over-EON", *Photonic Network Communications*, Springer, 41 (2021), pp.119-135.
  - **Pramit Biswas**, and Aneek Adhya, "Energy-Efficient Network Planning and Traffic Provisioning in IP-over-Elastic Optical Networks", *Optik - International Journal for Light and Electron Optics*, Elsevier, 185 (2019), pp.1115-1133.
  - Md Shahbaz Akhtar, **Pramit Biswas**, and Aneek Adhya, "An ILP-Based CapEx and OpEx Efficient Multi-Stage TDM/TWDM PON Design Methodology", *Optical Fiber Technology*, Elsevier, 46 (2018), pp.205-214.
- **Conference**
  - Md Shahbaz Akhtar, Jitendra Gupta, **Pramit Biswas**, Aneek Adhya, and Sudhan Majhi, "Heuristic-Based Cost-Efficient C-RAN Fronthaul Deployment Over TWDM-PON." IEEE International Conference on Recent Advances and Innovations in Engineering (ICRAIE), Dec. 2020, pp. 1-6, *Virtual*.
  - Md Shahbaz Akhtar, **Pramit Biswas**, Aneek Adhya, and Sudhan Majhi, "Cost-efficient Mobile Backhaul Network Design over TWDM-PON." IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), Dec. 2020, pp. 1-6, *Virtual*.
  - **Pramit Biswas**, Aneek Adhya, Shabaz Akhtar, Jitendra Gupta, and Sudhan Majhi, "EDFA Active-sleep Transition Frequency and EDFA Occupancy Aware Dynamic Traffic Provisioning for Energy-efficient IP-over-EON," IEEE International Conferences on Signal Processing and Communication Systems (ICSPCS), Dec. 2019, pp. 1–7, *Gold Coast, Australia*.
  - **Pramit Biswas**, Suman Kr Dey, and Aneek Adhya, "Auxiliary graph-based energy-efficient dynamic connection grooming for elastic optical networks," IEEE Advanced Networks and Telecommunications Systems (ANTS), Nov. 2016, pp. 1–3, *IISC Bangalore, India*.
  - **Pramit Biswas**, Roshni Maiti, Anirban Kolay, Kaushik Das Sharma, Gautam Sarkar, "PSO Based PID Controller Design for Twin Rotor MIMO System", IEEE Conference on Control, Instrumentation, Energy and Communication (CIEC), 2014, pp. 56-60, *Kolkata, India*.
  - **Pramit Biswas**, Anirban Kolay, Roshni Maiti and Kaushik Das Sharma, "A Novel Path Planning Algorithm for Single Camera-Based Mobile Robot Navigation", Proceedings of Michael Faraday IET India Summit (MFIIS), Nov. 2013, CS-8, pp. 4.40, *Kolkata, India*.

CERTIFICATION

Data Science for Business - Level 1, 2 | 2020
Organization: *cognitiveclass.ai, IBM*

Data Science Foundations – Level 1, 2 | 2020
Organization: *cognitiveclass.ai, IBM*

KPMG Lean Six Sigma Green Belt | 2016
Organization: *Henry Harvin Education*

Embedded System | 2011
Organization: *Moniba Compu Academy* with *IBM*

LEISURE ACTIVITIES

Interested in the latest science and technology advancements | Financial market | Reading books | Sports: cricket, table tennis, swimming.