



Agenda of Visit

Designing a High Capacity Elastic Optical Network for Large Geography (USA and India) to Sustain Long Term Growth in Telecom Broadband Services.

- Foster Research Collaboration on a Common Area of Interest
 - 1. WP1: Develop an NLI based model over C+L bands scenario.
 - 2. WP2: Utilise the model to plan network upgrade.
 - 3. WP3: Develop strategies to reduce fragmentation under C+L bands scenario.
 - 4. WP4: Plan for efficient utilisation of C+L bands spectrum for disaster management and recovery.
- Cognitive Enrichment through Cross-Cultural Activities
 - 1. Learn about local culture with participation in various social groups and gatherings.
 - 2. Work in an heterogeneous cultural environment while valuing diverse thoughts to solve a larger problem.
 - 3. Participate in weekly meetings and group discussions to plan future steps of the work plan.
 - 4. Give presentations and talks on relevant optical broadband technologies.

Outcomes

- WP1: Develop an NLI based model over C+L bands scenario.
 - 1. Initial NLI modelling was achieved in IIIT Delhi (accepted in October 2019).
 - 2. Making the model adaptable for utilisation of Gain Flattening Filter (GFF) was completed by Match 2020.
 - 3. A techno-economic comparison of nC band and C+L bands scenario has been completed to show in which network size, a C+L bands scenario will be beneficial and paper writing is under progress for **ECOC 2020 conference.**
- WP2: Utilise the model to plan network upgrade to C+L bands.
 - 1. Mentored PhD student Mrs. Tanjila Ahmed towards her Ph.D. dissertation in the area of network upgrade strategy.
 - 2. Innovative spectrum utilisation-aware routing strategy was developed while considering a brownfield mixed-grid scenario with WDM and Flexgrid Islands. (Published in JOCN).
 - 3. Further steps have been taken to develop batch-upgrade strategies for network link upgrade towards C+L bands. (To be submitted to JOCN).
- Additional WP: Develop Optical Pattern Matching (OPM) circuit.
 - 1. Mentored Ms. Ying Tang towards her Ph.D. dissertation in the area of Photonic Firewall using OPM.
 - 2. Taught her the fundamentals of nonlinear interference to design optical logic gates.
 - 3. Designed new architectures using all optical logic gates while considering coherent modulation formats. (To be submitted to IEEE/OSA Journal)
- Other Outcomes:
 - 1. Enjoyed excellent interactions with faculty members and Fulbright scholars.
 - 2. Got exposed to new research areas through talks and seminars.
 - 3. Developed new friendships and expanded social interactions.

Summary

Following topics are open for investigation:

- 1. Topics on Defragmentations (WP3) and Disaster Management (WP4) are still open.
- 2. Primarily because physical-layer model further evolved towards dynamic use of GFF and inclusion of S Band.
- 3. Also a major disruption was due to COVID-19.

Learnings:

- 1. Learned about network planning.
- 2. Improved teaching skills, while explaining new technologies to Ph.D. students (Tanjila Ahmed and Ying Tang)
- 3. Gained exposure to a multicultural environment while interacting with Network Labs researchers and Fulbright scholars from various countries, consequently developing strong ties for future interdisciplinary collaborations.

Contributions:

- 1. Students have learned about the rising challenges in the physical layer while designing the next generation of broadband optical networks.
- 2. The vision that in future, optimum solutions will involve a harmonious interplay between the network and physical layers has been further corroborated.
- 3. Fostered a strong environment for interdisciplinary research.

Memories and Pictures

Fulbright Reception



Davis Bike Route and Memories





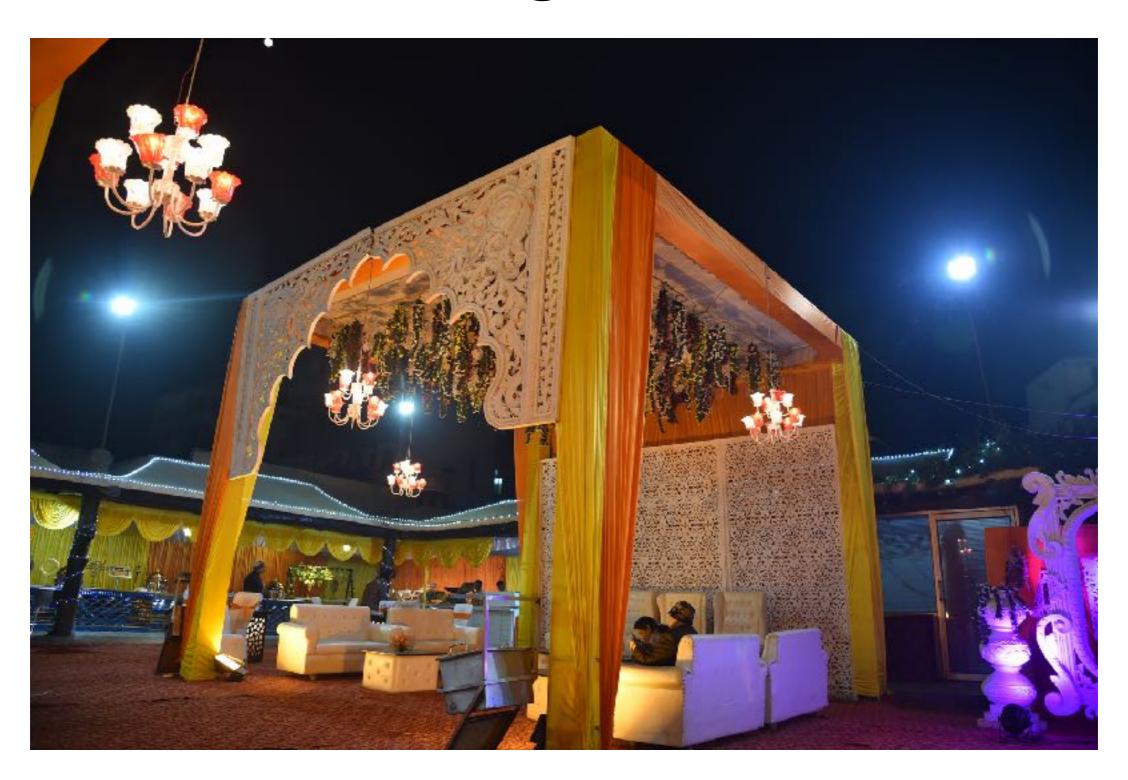


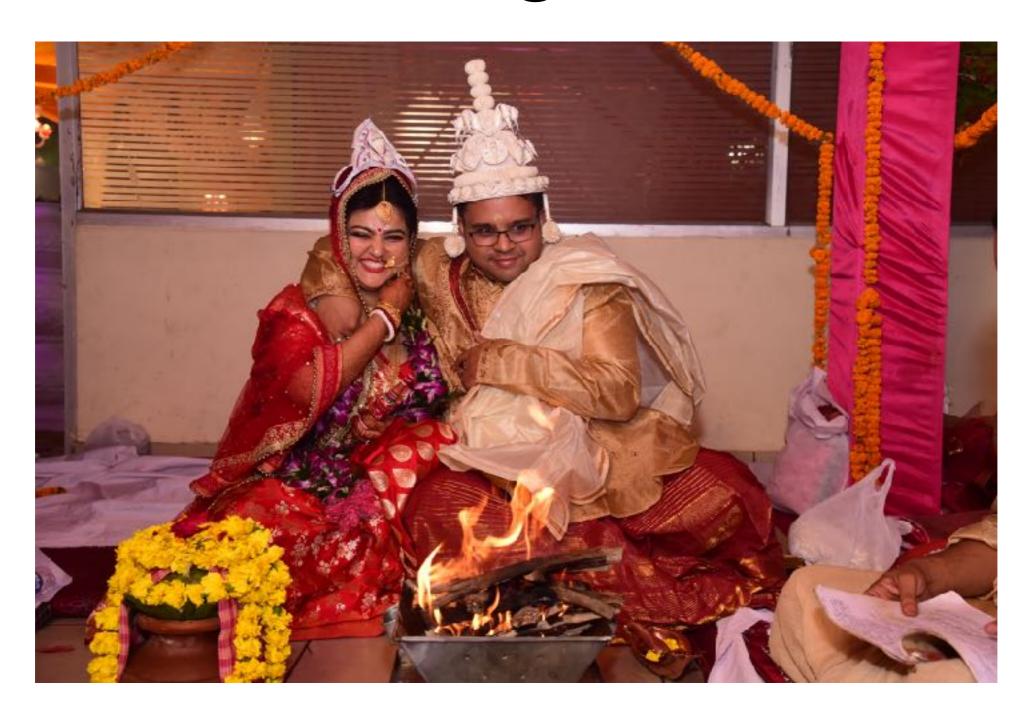
Indian Festivals







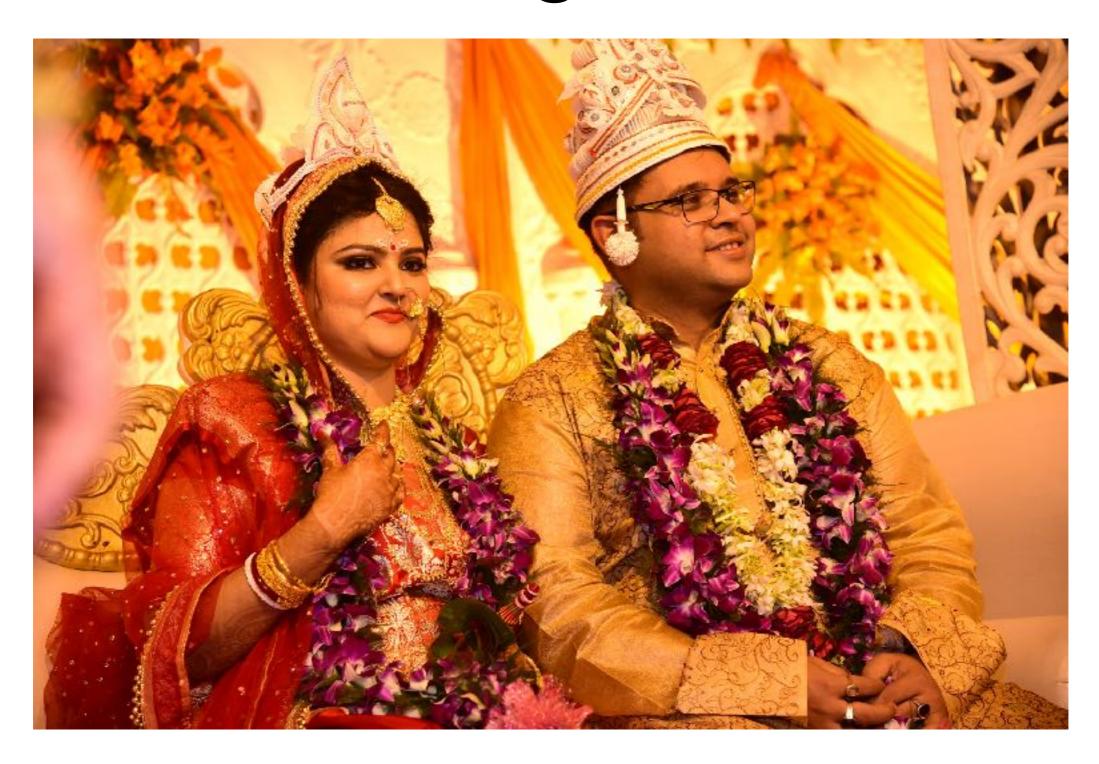












Reception Pics



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