

## ALBERT SUNNY

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Associate Professor

Computer Science and Engineering

Indian Institute of Technology Palakkad

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I am a faculty in Computer Science and Engineering discipline at IIT Palakkad. My research interests are in the areas of modelling, analysis and resource allocation in wireless and social networks.

### EDUCATION

- **Indian Institute of Science (IISc), Bangalore, India** **2012 - 2016**  
*Department of Electronic Systems Engineering*  
*Ph. D. in Engineering*  
Thesis Title: *Wireless and Social Networks: Some Challenges and Insights*
- **Indian Institute of Science (IISc), Bangalore, India** **2008 - 2011**  
*Department of Electronic Systems Engineering*  
*Master of Science in Engineering*  
Thesis Title: *Distributed Wireless Networks: Link Scheduling and Application Delay Modelling*  
Major : *Wireless Communication Networks*
- **National Institute of Technology Calicut, India** **2003 - 2007**  
*Department of Electrical Engineering*  
*Bachelor of Technology*  
Major: *Electrical and Electronics Engineering*

### RESEARCH EXPERIENCE (EXCLUDING Ph. D.)

- *Associate Professor* **Jun 2023 - Present**  
Indian Institute of Technology Palakkad, India  
*Role:* Researching modelling, analysis and resource allocation in various wireless and social networks.
- *Assistant Professor* **Jun 2018 - Jun 2023**  
Indian Institute of Technology Palakkad, India  
*Role:* Researching modelling, analysis and resource allocation in various wireless and social networks.
- *Post-doctoral Researcher* **Jul 2017 - Apr 2018**  
NEO team, INRIA Sophia Antipolis, France  
*Work location:* University of Avignon, France  
*Role:* Used performance analysis and control tools to design scheduling algorithms for transmission of streaming video traffic over wireless channels.

- *Research Assistant* **Feb 2012 - Aug 2012**  
Indian Institute of Science, Bangalore, India  
*Role:* Investigated the requirement of performance management in IEEE 802.11 Infrastructure WLANs.
- *Research Assistant* **Jun 2011 - Jan 2012**  
Indian Institute of Science, Bangalore, India  
*Role:* Investigated the requirement, and the problem of aggregate utility maximization in wireless mesh networks under a distributed greedy heuristic.
- *M. Sc. (Engg.)* **Aug 2009 - Aug 2011**  
Indian Institute of Science, Bangalore, India  
*Role:* Studied the problem of joint congestion control, routing and MAC layer scheduling in multihop wireless network in the framework of cross-layer optimization.

## INDUSTRY EXPERIENCE

- *Director and Board Member* **May 2021 - Present**  
IIT Palakkad Technology IHub Foundation, Palakkad, India  
*Role:* Helping streamline process and policies with the objective of meeting the scientific and technological mandates of the company.
- *Chief Technology Officer* **Mar 2017 - May 2018**  
Wootz Technologies Pvt. Ltd., Bangalore, India  
*Role:* Focusing on scientific and technical issues within the company. Essentially, responsible for leveraging the right technology, scientific knowledge and system architecture to create a market ready product.
- *Head of R&D* **Dec 2016 - Feb 2017**  
Wootz Technologies Pvt. Ltd., Bangalore, India  
*Role:* Built a Java based discrete event simulator to evaluate the performance of the proposed methods. Proposed and implemented a probabilistic demand forecast module. Proposed and implemented a carrier predication and segregation module. Proposed and built a website to demonstrate the efficacy of the above mentioned modules.
- *Consultant* **Apr 2016 - Dec 2016**  
Wootz Technologies Pvt. Ltd., Bangalore, India  
*Role:* As a part of this startup, my role was to investigate, identify and propose methods to tackle on-demand vehicle routing problem. The proposed methods were also incorporated into a web portal using technologies such as *Java, Javascript, Node.js and MongoDB*.

## OTHERS

- *Project Director* **Feb 2021 - Present**  
Technology Innovation Hub on Intelligent Collaborative System  
Indian Institute of Technology Palakkad, India  
*Role:* To promote technology and skill development initiatives by acting as an interface between hub, and faculty and students of IIT Palakkad.

## TEACHING EXPERIENCE

- *Assistant Professor* **Jun 2018 - Present**  
Indian Institute of Technology Palakkad, India
  - *ID1110: Introduction to Programming*; 2023.
  - *CS5016: Computational Methods and Applications*; 2021, 2022, 2023.
  - *CS5107: Programming Lab*; 2020, 2021.
  - *CS4010: Computer Networks*; 2019, 2020, 2021, 2022.
  - *CS4150: Computer Networks Lab*; 2019, 2020, 2021, 2022.
  - *CS1020: Introduction to Programming*; 2020, 2021.
  - *CS4602: Convex Optimization*; 2019.
  - *CS2180: Artificial Intelligence Lab*; 2019.
  - *CS4501: Game Theory*; 2018.
  - *CS2130: Data Structures and Algorithms Lab*; 2018.
- *Teaching Assistant* **2015 - 2016**  
Indian Institute of Science, India
  - *E0-330: Convex Optimization and Applications*; 2016.
  - *E2-243: Mathematics for Electrical Engineers*; 2015.

## SPONSORED PROJECTS

- *ZIGBEE-based Wireless Sensor Network for Landslide* **2020 - 2022**  
*Agency:* Indian Space Research Organisation (ISRO)  
*Budget:* ₹ 15.52 Lakhs  
*Role:* Primary Investigator (PI)  
*Summary:* Building a network of sensor nodes to monitor the various physical quantities of interest such as pore water pressure, rainfall and soil movement with the goal of monitoring land-slide prone areas and possibly predicting shallow landslides.
- *Unified Framework for Collaborative Intelligent Systems* **2021 - 2026**  
*Agency:* IIT Palakkad Technology IHub Foundation (IPTIF)  
*Budget:* ₹ 300.00 Lakhs  
*Role:* Primary Investigator (PI)  
*Summary:* Building an infrastructure that abstracts out individual systems into end-points, and create a standardized framework for these end-points to seamlessly collaborate with each other to deliver intelligent services. We also plan to develop products and technologies that demonstrate the benefits of such collaborative services in streamlining the supply chain of farm produce.
- *Design and Evaluation of OTFS and OCDM Transceivers for Underwater Acoustic Communication* **2022 - 2025**  
*Agency:* Naval Research Board  
*Budget:* ₹ 21.36 Lakhs  
*Role:* Co-Investigator  
*Summary:* Performance study of OTFS and OCDM signalling in UWA communication channels. Analyze impact of practical imperfections such as estimation errors and reduced guard intervals. Design principles to meet the service requirements to UWA communication systems.

## OTHER PROJECTS

Visit <https://albert-sunny.github.io/projects>

## PATENTS

1. Dimitrios Tsilimantos, Rachid El-Azouzi, **Albert Sunny**, “Communication Entity and a Method for Transmitting a Video Data Stream,” *U.S. Patent No. 11,627,358*, 11 Apr. 2023.

## ARTICLES IN PEER-REVIEWED JOURNALS

1. Reshma Prasad and **Albert Sunny**, “Scheduling Slice Requests in 5G Networks,” in *IEEE/ACM Transactions on Networking*, Early Access.
2. Swapnil Dhamal, Walid Ben-Ameur, Tijani Chahed, Eitan Altman, **Albert Sunny**, Sudheer Poojary, “A Game-theoretic Framework for Distributed Computing with Dynamic Set of Agents,” in *Annals of Operations Research*, Feb. 2023.
3. Ashok Kumar, M., **Albert Sunny**, Ashish Thakre, Ashisha Kumar, and G. Dinesh Manohar, “Are Guessing, Source Coding and Tasks Partitioning Birds of A Feather?,” *Entropy*, vol. 24, Issue. 11: 1695, Nov 2022.
4. Swapnil Dhamal, Walid Ben-Ameur, Tijani Chahed, Eitan Altman, **Albert Sunny**, Sudheer Poojary, “Strategic Investments in Distributed Computing: A Stochastic Game Perspective,” in *Elsevier Journal of Parallel and Distributed Computing*, vol. 169, pp., 317-333, Nov. 2022.
5. Reena Chackochan, **Albert Sunny** and Senthilkumar Dhanasekaran, “Approximate Aggregate Utility Maximization Using Greedy Maximal Scheduling,” in *IEEE/ACM Transactions on Networking*, vol. 30, no. 6, pp. 2521-2530, Dec. 2022.
6. **Albert Sunny**, Rachid El-Azouzi, Afaf Arfaoui, Eitan Altman, Sudheer Poojary, Dimitrios Tsilimantos, and Stefan Valentin, “Enforcing Bitrate-Stability for Adaptive Streaming Traffic in Cellular Networks,” in *IEEE Transactions on Network and Service Management*, vol. 16, no. 4, pp. 1812-1825, Dec. 2019.
7. Reena Chackochan, Senthilkumar Dhanasekaran and **Albert Sunny**, “Asynchronous Distributed Greedy Link Scheduling in Multihop Wireless Networks,” in *IEEE Transactions on Vehicular Technology*, vol. 67, no. 10, pp. 10166-10170, Oct. 2018.
8. Tapas Kumar Patra and **Albert Sunny**, “Forwarding in Heterogeneous Mobile Opportunistic Networks,” in *IEEE Communications Letters*, vol. 22, no. 3, pp. 626-629, March 2018.
9. Srinath Narasimha, Joy Kuri and **Albert Sunny**, “Reduced-Complexity Delay-Efficient Throughput-Optimal Scheduling with Heterogeneously Delayed Network-State Information,” in *Elsevier Performance Evaluation*, vol. 121-122, pp. 18-37, March 2018.
10. Bhushan Kotnis, **Albert Sunny** and Joy Kuri, “Incentivized Campaigning in Social Networks,” in *IEEE/ACM Transactions on Networking*, vol. 25, no. 3, pp. 1621-1634, June 2017.
11. **Albert Sunny**, Sumankumar Panchal, Nikhil Vidhani, Subhashini Krishnasamy, S.V.R. Anand, Malati Hegde, Joy Kuri and Anurag Kumar, “A Generic Controller for Managing TCP Transfers in IEEE 802.11 Infrastructure WLANs,” in *Elsevier Journal of Network and Computer Applications*, vol. 93C, pp. 13-26, May 2017.

12. **Albert Sunny**, “Joint Scheduling and Sensing Allocation in Energy Harvesting Sensor Networks with Fusion Centers,” in *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 12, pp. 3577-3589, Dec 2016.
13. **Albert Sunny** and Joy Kuri, “A Framework for Designing Multihop Energy Harvesting Sensor Networks,” in *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 5, pp. 1491-1501, May 2016.
14. **Albert Sunny**, Siddhartha Sarma and Joy Kuri, “Secure Transmission in Cooperative Networks with Weak Eavesdroppers,” in *IEEE Signal Processing Letters*, vol.22, no.10, pp.1693-1697, Oct. 2015.
15. **Albert Sunny**, Bhushan Kotnis and Joy Kuri, “Dynamics of History-dependent Epidemics in Temporal Networks,” in *Physical Review E*, vol.92, no.2, pp.022811-022820, Aug. 2015.

#### ARTICLES IN PEER-REVIEWED CONFERENCES

1. M. Ashok Kumar, **Albert Sunny**, Ashish Thakre, Ashisha Kumar, and G. Dinesh Manohar, “A Unified Framework for Problems on Guessing, Source Coding, and Tasks Partitioning,” in Proceedings of *IEEE International Symposium on Information Theory (ISIT)*, pp. 3339-3344, Jul 2022.
2. Rachid El-Azouzi, **Albert Sunny**, Liang Zhao, Eitan Altman, Dimitrios Tsilimantos, Francesco De Pellegrini and Stefan Valentin, “Dynamic DASH Aware Scheduling in Cellular Networks,” in Proceedings of *IEEE Wireless Communications and Networking Conference (WCNC)*, Marrakesh, Morocco, 2019, pp. 1-8.
3. Rachid El-Azouzi, Krishna V Acharya, Sudheer Poojary, **Albert Sunny**, Majed Haddad, Eitan Altman, Dimitrios Tsilimantos and Stefan Valentin, “Analysis of QoE for Adaptive Video Streaming over Wireless Networks with User Abandonment Behavior,” in Proceedings of *IEEE Wireless Communications and Networking Conference (WCNC)*, Marrakesh, Morocco, 2019, pp. 1-8.
4. Sudheer Poojary, Rachid El-Azouzi, Eitan Altman, **Albert Sunny**, Imen Triki, Majed Haddad, Tania Jimenez, Stefan Valentin and Dimitrios Tsilimantos, ”Analysis of QoE for adaptive video streaming over wireless networks,” in Proceedings of *16th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, Shanghai, China, 2018, pp. 1-8.
5. **Albert Sunny**, Siddhartha Sarma and Joy Kuri, “Beating Resource Constrained Eavesdroppers: A Physical Layer Security Study,” in Proceedings of *IEEE 13th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, vol., no., pp.167-174, 25-29 May 2015, Mumbai, India.
6. **Albert Sunny** and Joy Kuri, “Link Dependence Probabilities in IEEE 802.11 Infrastructure WLANs,” in Proceedings of *IEEE 13th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, vol., no., pp.148-153, 25-29 May 2015, Mumbai, India.
7. **Albert Sunny**, Joy Kuri and Saurabh Aggarwal, “Application Delay Modelling for Variable Length Packets in Single Cell IEEE 802.11 WLANs,” in Proceedings of *IEEE National Conference on Communications (NCC)*, vol., no., pp.1-5, 28-30 Jan. 2011, Bangalore, India.

8. **Albert Sunny**, Joy Kuri and Saurabh Aggarwal, “Delay Modelling for a Single-hop Wireless Mesh Network under Light Aggregate Traffic,” in Proceedings of *IEEE International Conference on Communications and Signal Processing (ICCSP)* , vol., no., pp.271-275, 10-12 Feb. 2011, Calicut, India.
9. **Albert Sunny** and Joy Kuri, “Distributed Greedy Scheduling for Multihop Wireless Networks,” in Proceedings of *IEEE 7th International Conference on Mobile Adhoc and Sensor Systems (MASS)*, vol., no., pp.582-587, 8-12 Nov. 2010, San Francisco, U. S. A..

## INVITED TALKS

1. “*DASH-aware Scheduling in Cellular Network*,” IEEE International Conference on Signal Processing and Communications (SPCOM), Indian Institute of Science, Bangalore, 2022.
2. “*IoT Security Challenges*,” FDP on “Secure Internet of Things,” Indian Institute of Technology Palakkad, 2020.
3. “*IoT Network Security and Secure Protocols*,” FDP on “Secure Internet of Things,” Indian Institute of Technology Palakkad, 2020.
4. “*Recent Advances in Wireless Networks*,” STTP on “Recent Trends in Wireless Sensor Networks and Applications,” Malla Reddy Engineering College for Women, Hyderabad, 2020.
5. “*Physical Layer Security over Cooperative Networks*,” workshop on “Physical Layer Security — Theory to Practice,” Amrita Vishwa Vidyapeetham, Coimbatore, 2020.

## HONORS/AWARDS

- Selected as DST INSPIRE faculty fellow (Session II 2016).
- Selected for SERB Indo-U.S. postdoctoral fellowship 2017.

## SERVED AS REVIEWER FOR

- IEEE Communications Letters
- IEEE Journal on Selected Areas in Communications
- IEEE/ACM Transactions on Networking
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Information Forensics and Security
- IEEE Transactions on Network and Service Management
- Elsevier Journal of Network and Computer Applications
- Springer Wireless Personal Communications
- Springer Sadhana

## SOFTWARE SKILLS

- *Programming*: C, C++, Java, Javascript, Node.js, Python
- *Applications*: Julia, Matlab, Mathematica,  $\text{\LaTeX}$ , Microsoft Office, and other popular productivity packages for Windows and Linux platforms.