Name And Designation: Dr. Asisa Kumar Panigrahy, Associate Professor, Department of ECE

Email ID: asisa.nist@gmail.com, asisa@griet.ac.in

Educational Details:

1. **Ph.D.** (Electrical Engineering- **Microelectronics & VLSI**) from Indian Institute of Technology Hyderabad, Telangana, **August 2017**.

   Ph.D Thesis: Low temperature, Low Pressure and Fine pitch Cu-Cu thermo-compression bonding for Three Dimensional Integration Applications.

2. **M. Tech. (**VLSI & Embedded System Design) from B.P.U.T, Odisha, 2012. **(9.31 CGPA, 88.1%).**

   M.Tech Dissertation: Design of Low Power LDPC Decoder for High-speed wireless LAN using FPGA.

   Tools Used: XILINX, System Generator, MATLAB.

3. **B.Tech.** (Electronics & Communication Engineering) from National Institute of Science & Technology, Berhampur under B.P.U.T, Odisha, 2010. **(8.67 CGPA, 81.7%).**

   Major Project: Evaluation of coupling losses in Photonic crystal fibre for gas sensing application.

   Tools Used: MATLAB.

4. **Diploma** (Electronics & Telecommunication Engineering) from S.M.I.T., Berhampur under S.C.T.E & V.T, Odisha, 2006. (**85.47%**)

Professional Background:

1. I have worked as an Assistant Professor from 1st July 2012 to 30th June 2013 in the Department of Electronics & Communication Engineering at **National Institute of Science & Technology, Berhampur, Odisha**.

   - Taught several undergraduate Theory and Laboratory modules that included Basic Electronics, Analog Electronics Circuit, Hardware Description Language, VLSI Design and Digital Electronics Circuit.
   - Actively participated in several volunteer efforts and became an active member of the 'Community Development Program' mission of the institute.

2. I have worked as an **Associate Professor** in the Department of Electronics & Communication Engineering at **KL University** from 19th June 2017 to 3rd May 2018.

   Key Responsibilities: Dean R&D, Assistant Head of the Department

3. Currently working as an **Associate Professor** in the Department of Electronics & Communication Engineering at **GRIET, Hyderabad** since 4th May 2018.

Administrative Experience:

1. Dean R & D at **KL Deemed to be University (Hyderabad Campus).**
2. **Assistant HOD of the Department of ECE at KL Deemed to be University (Hyderabad Campus).**

Committee Work:

Mini Project coordinator at GRIET, Hyderabad from 2018-2019

Courses Taught:

- **UG:** Basic Electronics, Analog Electronics Circuit, VLSI Design, Digital Signal Processing, and Digital Electronics.
- **PG:** Hardware Description Language, Digital System Design, VLSI Technology and Design, Digital Signal Processors Architecture, Research Methodology.

PUBLICATIONS:

Publications and Patents (After award of Ph.D):

International Journals:

1. Banothu Rakesh, Kailaas Mahindra, Marri Sai Venkat Goud, N. Arun Vignesh, Tatiparti Padma, and **Asisa Kumar Panigrahy**. "Facile approach to mitigate thermal issues in 3D IC integration using effective FIN orientation." Materials Today: Proceedings (2020).

2. Dadaipally Pragathi, Banothu Rakesh, P. Sriram Kumar, N. Arun Vignesh, Tatiparti Padma, and **Asisa Kumar Panigrahy**. "Noise performance improvement in 3D IC integration utilizing different dielectric materials." *Materials Today: Proceedings* (2020).

3. **Asisa Kumar Panigrahi,** Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Surface Density Gradient Engineering Precedes Enhanced Diffusion; Drives CMOS in-line process flow compatible Cu-Cu Thermocompression bonding at 75 ˚C," Manuscript submitted ***IEEE Transactions on Devices and Materials Reliability*** (Published on 12th Nov 2019; **DOI: 10.1109/TDMR.2019.2952927)**

4. Satish Bonam, **Asisa Kumar Panigrahi,** C.Hemanth Kumar, Siva Rama Krishna Vanjari, Shiv Govind Singh, "Post-CMOS Compatible Engineered Ultra-thin Au passivated Cu-Cu thermocompression bonding for 3D IC and Heterogeneous Integration Applications," ***IEEE Transactions on Components, Packaging and Manufacturing Technology*** 9, no.7, pp. 1227-1234, 2019.

5. **Asisa Kumar Panigrahi,** Tamal Ghosh, C.Hemanth Kumar, Shiv Govind Singh, and Siva Rama Krishna Vanjari, "Direct, CMOS In-line Process flow compatible, Sub 100˚C Cu-Cu thermocompression bonding using Stress Engineering", ***Electronic Materials Letters*** 14, no. 3, pp. 328-335, 2018.

6. **Asisa Kumar Panigrahi,** Kuan-Neng Chen. "Low Temperature Cu-Cu Bonding Technology in 3D Integration: An Extensive Review", ***Journal of Electronic Packaging 140***, no. 1, 010801, 2018.

7. **Asisa Kumar Panigrahi**, C. Hemanth Kumar, Satish Bonam, Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Optimized ultra-thin manganin alloy passivated fine-pitch damascene compatible bump-less Cu–Cu bonding at sub 200 °C for three-dimensional Integration applications," ***Japanese Journal of Applied Physics 57***, 02BC04, 2018.

8. Satish Bonam, Jose Joseph, C.Hemanth Kumar, **Asisa Kumar Panigrahi,** Siva Rama Krishna Vanjari, Shiv Govind Singh, "Fabrication of Aperture Coupled Patch Antenna On-Silicon using Au-Passivated Cu-Cu Bonding," ***Manuscript submitted in IEEE Electron Device Letters*** (Under Review)

International Conferences

1. S. Sairam Akhil, N. Arun Vignesh, Sudharsan Jayabalan, E. Karthikeyan, Ayyem Pillai, Ch Usha Kumari, and **Asisa Kumar Panigrahy**, "A Novel Approach for detection of the symptomatic patterns in the acoustic biological signal using Truncation Multiplier." In *2019 2nd International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT)*, vol. 1, pp. 49-53. IEEE, 2019.

2. Ch Usha Kumari, Padmavathi Kora, K. Meenakshi, K. Swaraja, T. Padma, **Asisa Kumar Panigrahy**, and N. Arun Vignesh. "Feature Extraction and Detection of Obstructive Sleep Apnea from Raw EEG Signal." In *International Conference on Innovative Computing and Communications*, pp. 425-433. Springer, Singapore, 2020.

3. S. Kanithan, N. Arun Vignesh, Asisa Kumar Panigrahy, V. Ayyem Pillai, E. Karthikeyan, CH Usha Kumari, Sudharsan Jayabalan, and T. Santosh Kumar. "A Survey on Energy Efficient Image Transmission in WSN." In *2019 2nd International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT)*, vol. 1, pp. 41-44. IEEE, 2019.

4. **Asisa Kumar Panigrahi**, C.Hemanth Kumar, Satish Bonam, Tamal Ghosh, Nirupam Paul, Siva Rama Krishna Vanjari and Shiv Govind Singh "Metal-alloy Cu surface passivation leads to high quality fine -pitch bump-less Cu-Cu bonding for 3D IC and Heterogeneous integration applications," In IEEE 68th Electronic Components and Technology Conference (ECTC), pp. 1561-1566, IEEE, 2018.

5. C.Hemanth Kumar, **Asisa Kumar Panigrahi**, Satish Bonam, Tamal Ghosh, Nirupam Paul, Siva Rama Krishna Vanjari and Shiv Govind Singh, "Achieving of intensified conductive interconnections for Flex-on-Flex by using metal passivated Copper – Copper Thermocompression bonding," In IEEE 68th Electronic Components and Technology Conference (ECTC) pp. 1732-1737, IEEE, 2018.

6. **Asisa Kumar Panigrahi**, Satish Bonam, Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Diffusion enhanced drive sub 100 ˚C wafer level fine-pitch Cu-Cu thermocompression bonding for 3D IC integration," In 2019 IEEE 69th Electronic Components and Technology Conference (ECTC), pp. 2156-2161. IEEE, 2019.

Book Chapters:

1. Usha Kumari C., **Panigrahy A.K.**, Arun Vignesh N. (2020) Sleep Bruxism Disorder Detection and Feature Extraction Using Discrete Wavelet Transform. In: Singh P., Panigrahi B., Suryadevara N., Sharma S., Singh A. (eds) Proceedings of ICETIT 2019. *Lecture Notes in Electrical Engineering, vol 605. Springer, Cham*

Publications and Patents (Before award of Ph.D):

Patent:

1. **Asisa Kumar Panigrahi**, Satish Bonam, Siva Rama Krishna Vanjari, and Shiv Govind Singh "Optimized ultra-thin alloys leads sub 140 degree Celsius and Low Pressure 2.5 bar Cu-Cu bonding for 3D ICs", Indian Patent Issue No. **16/2018**, Published on 20th April 2018.

International Journals:

1. **Asisa Kumar Panigrahi,** Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Oxidation resistive, CMOS compatible Copper based Alloy ultrathin films as a superior passivation mechanism for achieving 150˚C Cu-Cu wafer on wafer thermocompression bonding, " ***IEEE Transactions on Electron Devices,*** 64(3), pp.1239-1245, 2017.

2. **Asisa Kumar Panigrahi,** Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Demonstration of Sub 150 ˚C Cu-Cu thermocompression bonding for 3D IC applications, utilizing an ultra-thin layer of Manganin alloy as an effective surface passivation layer", ***Materials Letters*** 194, pp.86-89, 2017.

3. **Asisa Kumar Panigrahi**, Brince Paul K, Vikrant Singh, and Shiv Govind Singh, "Multi-walled carbon nanotube- zinc oxide nanofiber based flexible chemiresitive biosensor for malaria biomarker detection", ***Analyst 142,*** *pp.* 2128-2135***,*** 2017.

4. Brince Paul K, **Asisa Kumar Panigrahi**, Vikrant Singh, and Shiv Govind Singh, "Nonlithographic fabrication of Plastic-based nanofibers Integrated Microfluidic Biochip for sensitive infectious biomarker detection", ***ACS applied materials & interfaces***, 9(46), 39994-40005, 2017.

5. **Asisa Kumar Panigrahi**, Satish Bonam, Tamal Ghosh, Shiv Govind Singh, and Siva Rama Krishna Vanjari, "Ultra-thin Ti passivation mediated breakthrough in high quality Cu-Cu bonding at low temperature and pressure," ***Materials Letters*** **169,** *pp.* 269-272, 2016.

6. Tamal Ghosh, K. Krushnamurthy, **Asisa Kumar Panigrahi**, Asudeb Dutta, Ch Subrahmanyam, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Facile non thermal plasma based desorption of self assembled monolayers for achieving low temperature and low pressure Cu–Cu thermo-compression bonding," ***RSC Advances*** **5**, no. 125, pp.103643-103648, 2015.

7. Nirupam Paul, Sudharshan Vadnala, **Asisa Kumar Panigrahi**, Hemanth Kumar, Amit Agrawal, and Shiv Govind Singh, "Vanadium Pentoxide Nanofibers as IR sensors for Bolometer Application", ***ECS Transactions***, 85(13), pp.1573-1583, 2018.

International Conferences:

1. **Asisa Kumar Panigrahi**, Satish Bonam, Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Low temperature, low pressure CMOS compatible Cu-Cu thermo-compression bonding with Ti passivation for 3D IC integration." In Electronic Components and Technology Conference (ECTC), 2015 IEEE 65th, pp. 2205-2210. IEEE, 2015. ***(IEEE Xplore)***

2. **Asisa Kumar Panigrahi**, Satish Bonam, Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Long term efficacy of ultra-thin Ti passivation layer for achieving low temperature, low pressure Cu-Cu Wafer-on-Wafer bonding", In 3D Systems Integration Conference (3DIC), 2015 International, pp. TS8-13. IEEE, 2015. ***(IEEE Xplore)***

3. **Asisa Kumar Panigrahi**, Satish Bonam, Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "High quality fine-pitch Cu-Cu Wafer-on-Wafer bonding with optimized Ti passivation at 160˚C", In 66th IEEE Electronic Components and Technology Conference

(ECTC), 2016 IEEE, pp. 1791-1796. IEEE, 2016. ***(IEEE Xplore)***

4. **Asisa Kumar Panigrahi,** S. Bonam, T. Ghosh, S. R. Krishna Vanjari and S. Govind Singh, "Low temperature CMOS compatible Cu-Cu thermo-compression bonding with constantan alloy passivation for 3D IC integration," 2016 IEEE International 3D Systems Integration Conference (3DIC), San Francisco, CA, USA, 2016, pp. 1-4. ***(IEEE Xplore)***

5. Satish Bonam, **Asisa Kumar Panigrahi**, Shikhar Jain, Siva Rama Krishna Vanjari, and Shiv Govind Singh, " Ultra-thin Gold Passivation as a Viable Alternative for Achieving Low Temperature, Low Pressure Cu-Cu Thermocompression Bonding." In 13th International Wafer-level Packaging Conference, 2016, pp.

6. Suraj Patil, **Asisa Kumar Panigrahi**, Satish Bonam, C.Hemanth Kumar, Om Krishan Singh, and Shiv Govind Singh, "Improved noise coupling performance using optimized Teflon liner with different TSV structures for 3D IC integration," In 3D Systems Integration Conference (3DIC), 2016 IEEE International, pp. 1-4. IEEE, 2016. ***(IEEE Xplore)***

7. Suraj Singh, **Asisa Kumar Panigrahi**, Om Krishan Singh, and Shiv Govind Singh, "Analysis of Graphene and CNT based finned TTSV and spreaders for thermal management in 3D IC Technology," In 3D Systems Integration Conference (3DIC), 2016 IEEE International, pp.1-4. ***(IEEE Xplore)***

8. C.Hemanth Kumar, **Asisa Kumar Panigrahi,** Om Krishan Singh, and Shiv Govind Singh, " Noise performance improvement through optimized stacked layer of liner structure around the TSV in 3D IC," In 3D Systems Integration Conference (3DIC), 2016 IEEE International, pp.1-4. (IEEE Xplore).

9. Kumail Khurram, **Asisa Kumar Panigrahi**, Satish Bonam, Om Krishan Singh, and Shiv Govind Singh, " Novel Inter Layer Dielectric and Thermal TSV material for enhanced heat mitigation in 3D IC," In 3D Systems Integration Conference (3DIC), 2016 IEEE International, pp.1-4. ***(IEEE Xplore)***

10. **Asisa Kumar Panigrahi**, Tamal Ghosh, Siva Rama Krishna Vanjari, and Shiv Govind Singh, "Dual Damascene compatible, copper rich alloy based surface passivation mechanism for achieving Cu-Cu bonding at 150˚C for 3D IC integration," In Electronic Components and Technology Conference (ECTC), 2017 IEEE 67th, pp. 982-988.***(IEEE Xplore)***

11. **Asisa Kumar Panigrahi**, C.Hemanth Kumar, Tamal Ghosh, Siva Rama Krishna Vanjari and Shiv Govind Singh, "Optimized ultra-thin Manganin alloy Passivated fine-pitch damascene compatible Cu-Cu bonding at sub 200°C for 3D IC Integration," In Low Temperature Bonding for 3D Integration (LTB-3D), 2017 5th International Workshop on, pp. 35-35. (Invited for Speaker) ***(IEEE Xplore)***

Review Work: Many Papers

Reviewer for Journals and Books:

1. **Applied Materials & Interface -ACS**
2. **Materials Today Proceedings – Elsevier**
3. **Microelectronic Engineering -Elsevier**

PROFESSIONAL WORK:

Talks/Paper Presentations:

1. Attended and Presented paper entitled "A Novel Approach for detection of the symptomatic patterns in the acoustic biological signal using Truncation Multiplier" at 2nd IEEE International Conference on Intelligent Computing, Instrumentation and Control Technologies, ICICICT 2019, Vimal Jyothi Engineering College, Chemperi, Kannur, India
2. Attended and Presented an **invited paper** entitled "Optimized ultra-thin Manganin alloy Passivated fine-pitch damascene compatible Cu-Cu bonding at sub 200°C for 3D IC Integration" at 5th IEEE International Workshop on Low temperature bonding for 3D Integration, **University of Tokyo, Japan**, 2017
3. Attended and presented poster entitled "High quality fine-pitch Cu-Cu Wafer-on-Wafer bonding with optimized Ti passivation at 160˚C" in 66th **IEEE Electronics Component & Technology Conference 2016,** 31st May - 03 June, 2016, at Las Vegas, Nevada, USA.
4. Attended and presented paper entitled "Optimized ultra-thin Ti Passivation for achieving high quality fine pitch bump less Cu-Cu Wafer-on-Wafer bonding at 175˚ C" in **18th International Workshop on Physics of Semiconductor Devices** (**18th IWPSD),** 7th to 10th December 2015, at IISc, Bangalore, India.
5. Attended and presented poster entitled "Low Temperature, Low Pressure CMOS Compatible Cu-Cu Thermo-compression Bonding with Ti Passivation For 3D IC Integration" in 65th **IEEE Electronics Component & Technology Conference 2015,** 26th to 29th May 2015, at San Diego, California, USA.

Seminars and Symposiums:

1. Attended **Bio Asia 2017 conference** from 6th to 8th Feb 2017 at Novotel International Convention Centre, Hyderabad.
2. Attended **INUP Hands-on Training Workshop** and participated in the Hands-on Training on MEMS Cantilever Fabrication and Micro and Nano Characterization Techniques during 3rd to 12th Feb, 2015 at IISc, Bangalore.
3. Attended **2nd INUP Familiarization Workshop** on Nanofabrication Technologies during 28th to 30th Nov, 2014 at IIT, Bombay.
4. **IEEE-EDS** Mini-colloquium on "**Nanoelectronics**" on 30 Nov 2010 at NIST, Berhampur. (Speaker: Hiroshi Iwai, Japan).

Memberships:

External Examiner : (means lab external examiner,paper setting/moderator..etc)

1. External Examiner for final Project evaluation at CVR Engineering College, Hyderabad.
2. Question Paper Setter for 3rd year students exam.

AWARDS AND ACHIEVEMENTS:

1. Recipient of **Gandhian Young Technological Innovation Award** (GYTI-2018) for my research work "A Low-Cost Disposable Microfluidic Biochip for malaria diagnosis" from the **honourable president of India Shri Ram Nath Kovind Ji** at Rhastrapati Bhavan on 19th March 2018.

2. **Japanese Society for the Promotion of Science (JSPS) award** as an invited speaker for 5th International IEEE Workshop on Low Temperature Bonding for 3D Integration will be held in Tokyo, Japan, on May 16th to 18th, 2017.

3. Recipient of **Excellence in Research award** on two consecutive years during Ph.D. on the foundation day of the institute (Indian Institute of Technology-Hyderabad) for the calendar year of 2015 and 2016.

4. **DST Young Scientist** Grant under International Travel Support (ITS) scheme to attend 66th IEEE Electronics Component & Technology Conference (ECTC) 2016 at **Las Vegas, Nevada, USA** from 31st May - 03 June, 2016 (Ref No. ITS/470/2016-17).

5. **CSIR Young Scientist** foreign travel Grant to attend 6th IEEE Electronics System-Integration Technology Conference, **Grenoble, France** during 13 Sep 2016 to 16 Sep 2016 (Ref No. TG/8931/16-HRD).

6. **MHRD International travel fund** to attend 65th IEEE Electronics Component & Technology Conference (ECTC) 2016 at **San Diego, California, USA** from 26th -29th May, 2015.

7. **SPTS Go Pro Hero Award** for best Interactive presentation during 65th IEEE Electronics Component & Technology Conference (ECTC) 2015 at **San Diego, California, USA** from 26th - 29th May, 2015.

8. **Institute Fellowship** to attend 18th IWPSD 2015 at IISc, Bangalore from 7th – 10th Dec, 2015.

9. Awarded **9 pointer** multiple times during Bachelor of Technology at NIST, Bam, Odisha.

Certifications

1. **TEQIP online Certification for** successfully completing 2 week course on "Digital Transformation in Teaching Learning Process" conducted **by IIT Bombay from** April 6th to April 22nd 2020.
2. Successfully completed LaTeX course with certification test organized at Sanjay Ghodawat University by Nilesh Vijay Sabnis with course material provided by the Spoken Tutorial Project, IIT Bombay. Passing an online exam, conducted remotely from IIT Bombay, is a pre-requisite for completing this training. SHRISHAIL SALGARE at Sanjay Ghodawat University invigilated this examination. **This training is offered by the Spoken Tutorial Project, IIT Bombay, funded by National Mission on Education through ICT, MHRD, Govt., of India on May 6th 2020.**
3. Certification on Training of Laser Writer (LW405B): **Microtech, Italy**, September-2014.
4. CEQIP Course on "**Semiconductor Technology & Manufacturing**" from 10th to 15th December, 2013 at IIT Bombay.

5. Undertake a **21 days** training program on the course entitled **“Electronic Design Automation Software Tools for VLSI/ASIC design”** at NIST, Berhampur.

Appreciations

1. Recipient of **Gandhian Young Technological Innovation Award** (GYTI-2018) for my research work “A Low-Cost Disposable Microfluidic Biochip for malaria diagnosis" from the **honourable president of India Shri Ram Nath Kovind Ji** at Rhastrapati Bhavan on 19th March 2018.