VANSHIKA KANSAL

vanshikakansal@gmail.com
Nationality: Indian

EXPERIENCE

CEA | Paris-Saclay, France
Research Engineer | 11/2018 to 11/2021

- Implementation lead and Verification for 2D Mass Weak Lensing Processing Function of the ESA Euclid mission.
- Verification and Validation for 2D Mass Weak Lensing Processing Function.
- In-charge of development and integration of pipelines and Data Model in all Euclid Organization Unit Level 3.
- Lead the project and/or other Engineers involved with the development and implementation.
- Worked on other processing functions and pipelines such as Photometric Visibility Mask.
- Reviewed code and Data Model of the other processing functions.
- Participated in the development of Euclid libraries.

ESAC-ESA | Madrid, Spain
Research Intern (Master thesis) | 04/2018 to 08/2018

- Worked on NISP (Near Infrared Spectrometer and Photometer) instrument simulator of the ESA Euclid mission to model and simulate Solar system objects.
- Performed Photometry and Astrometry to find out Flux distribution and detect moving objects respectively.
- Report: KANSAL, V. (2018). Simulation of Solar System Objects for the NISP instrument of the ESA Euclid Mission (Dissertation). Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:ltu:diva-72221

INDUSTRIAL EXPERIENCE

esc Aerospace | Prague, Czech Republic
Intern (Summer Internship) | 07/2017 to 08/2017

- Worked on Sentinel Satellite and Demise Observation Capsule (DOC) Proto-Flight Model under the FLPP-3 program.
- Sentinel Satellite: Worked on ground station code refinement, optimise, maintenance and validation of the ground segment code.
- DOC: The general objective of DOC was to prepare the technical and programmatic elements to enable an efficient launcher design where I was responsible for DOC graphical user interface.

Sapro Robotics | Ghaziabad, India
Embedded Software Engineer | 01/2013 to 07/2016

- Worked on Design, development, installation and testing of the client-specific applications
- Performed research and development to enhance the utility of applications for existing clients
- Provided hands-on workshops to students from universities & Prepared user and self-training manuals for clients.

Aquarian Infotech Systems | Noida, India
Assistant Software Developer | 07/2011 to 08/2012

- Design, develop and implement the system requirement keeping limitations & dependencies across the modules in mind.
- Maintain, validate code and software standards.

Sakshay Web Technologies Pvt. Ltd | New Delhi, India
Trainee (Summer Internship) | 06/2010 to 07/2010

- Worked on asp.net for developing websites.

EDUCATION

Master of Science and Technology: Space Technology and Instrumentation (M2)
Université Toulouse III - Paul Sabatier | 2017 to 2018
Toulouse, France

- Worked on Balloon project: Project concerns the measurement of physical characteristics of the Stratosphere, the flight environment, data acquisition, and the transmission of simple signals and transmission losses in the atmosphere and finally the exploitation of these data.

Master of Science: Space Technology
Luleå University of Technology | 2016 to 2018
Kiruna, Sweden

- Monitored and predicted the space weather i.e., conditions on sun & in the solar wind, Earth's magnetosphere, ionosphere thermosphere that causes Auroras and can influence the performance and reliability of space/ground based technological system and endanger human life.
  Analysed EISCAT ESR radar data, Advanced Composition Explorer (ACE) satellite, Cluster satellites and Rosetta data to work on statistics of solar wind velocity, proton density & magnetic-field components and to find out the expected energy per charge solar wind components/species.
- Implementation & Design of a floating satellite with a mission of shooting Asteroids with accuracy controlled by ground station. I was responsible to the develop the Electronics of the satellite, GUI for ground station and telemetry & tele-command with satellite using ground station. (Link: https://www.youtube.com/watch?v=2QIhp2wkuzY)

Master in Technology: Automation & Robotics
Dr. A.P.J. Abdul Kalam Technical University | 2013 to 2015
India

- Developed a wireless interface to control an arm using gesture of human being which can be operated through a range of 10 to 90 meters.
- Worked on Pneumatics & Hydraulics systems and PLCs with BOSCH Rexorth and simulated the Pneumatics & Hydraulics designs with different PLCs in Automation Studio (Famic Technologies).
- Worked on KUKA Industrial robot control systems.
- Programmed and documented the robust LabVIEW applications.

Master of Business Administration: Information Technology
Sikkim Manipal University Distance Education | 2012 to 2013
India

- Selected Coursework: Business Communication, Statistics for Management, Research methodology, Project Management

Bachelor's in Technology: Computer Science & Engineering
Dr. A.P.J. Abdul Kalam Technical University | 2007 to 2011
India

- Selected Coursework: Numerical & Statistical Techniques, Data Structure, Database management, Operating systems, Computer networks, Design & Analysis of Algorithms, Principle of Programming Languages, Digital Image processing, Distributed Systems, Artificial Intelligence

SUCCESSFUL COMPLETED PROPOSALS

- Precision galaxy-galaxy weak lensing at 10-100 kpc scales (awarded time on the AAT Telescope) | Semester B 2024 (19 nights)
- Precision galaxy-galaxy weak lensing at 10-100 kpc scales (awarded time on the AAT Telescope) | Semester A 2024 (22 nights)
- Dynamics, Dark Matter, and Precision Weak Lensing (awarded time on the AAT Telescope) | September 2023 (6 nights)
- Dynamics, Dark Matter, and Precision Weak Lensing (awarded time on the ANU 2.3 Telescope) | February 2023 (6 nights)
- The Stellar-to-Halo Mass relation with Kinematic Weak Lensing (awarded time on the Keck II Telescope, Semester 2022B) | October 2022 (1 night)
- The Stellar-to-Halo Mass Relation from Kinematic Weak Lensing (awarded time on the VLT+FORS2 Telescope) | (1 night)
- Dynamics, Dark Matter, and Precision Weak Lensing (awarded time on the ANU 2.3 Telescope) | September 2022 (6 nights)
- Better Weak Lensing through Integral Field Spectroscopy (awarded time on the ANU 2.3 Telescope) | May 2022 (4 nights)

ASTRONOMICAL OBSERVATIONS

- August 2024 (8 night) | Australian Astronomical Observatory (AAO), Australia **[16k AUD]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- July 2024 (10 night) | Australian Astronomical Observatory (AAO), Australia **[20k AUD]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- June 2024 (2 night) | Australian Astronomical Observatory (AAO), Australia **[4k AUD]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- May 2024 (3 night) | Australian Astronomical Observatory (AAO), Australia **[6k AUD]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- April 2024 (3 night) | Australian Astronomical Observatory (AAO), Australia **[6k AUD]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- March 2024 (4 night) | Australian Astronomical Observatory (AAO), Australia **[8k AUD]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- January 2024 (3 night) | Australian Astronomical Observatory (AAO), Australia **[SUPPORT]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- September 2023 (6 night) | Australian Astronomical Observatory (AAO), Australia **[11k AUD]**
  Instrument: Anglo-Australian 4m Telescope (AAT) with AAOmega + KOALA
- February 2023 (6 night) | Siding Spring Observatory, Australia **[11k AUD]**
  Instrument: ANU 2.3m Telescope with Wide Field Spectrograph (WiFeS)
- October 2022 (1 night) | W. M. Keck Observatory, Hawaii **[150k USD]**
  Instrument: 10m Telescope with Deep Imaging Multi-Object Spectrograph (DEIMOS)
- September 2022 (6 nights) | Siding Spring Observatory, Australia **[11k AUD]**
  Instrument: ANU 2.3m Telescope with Wide Field Spectrograph (WiFeS)
- May 2022 (4 nights) | Siding Spring Observatory, Australia **[8k AUD]**
  Instrument: ANU 2.3m Telescope with Wide Field Spectrograph (WiFeS)

ENGINEERING/COMMISSIONING NIGHTS

- October 2023 (3 night) | W. M. Keck Observatory, Hawaii
  Instrument: NIRC2 Keck adaptive optics system
- November 2023 (3 night) | W. M. Keck Observatory, Hawaii
  Instrument: NIRC2 Keck adaptive optics system

GRANTS

- Travel grant from Swinburne University of Technology & ARC Centre of Excellence for Dark Matter Particle Physics **[15K AUD]**, 2024.
- Travel grant from W. M. Keck Observatory **[30K USD]**, 2023.
- Research Fellowship from Swinburne University of Technology **[140K AUD]**, 2023.
- Research Grant from ARC Centre of Excellence for Dark Matter Particle Physics [**100K AUD**], 2022
- Observational grant from the joint arrangement between Swinburne and Caltech [1 night; **150K USD**], 2022
- Erasmus+ grant, [1yr; **6k €**], 2017-2018

JUDGE

- Judged the Indian Robot Olympiad (IRO) in Regular category for Delhi-NCR Regional Competition, 2013
- Judged the Indian Robot Olympiad (IRO) in Regular category for National Final Competition, 2013

ACKNOWLEDGEMENTS

- Won a **"Meta Quest VR Headset"** at Astronomical Society of Australia, Annual Science Meeting 2024.
- Winning Team member of **"BUILD YOUR OWN DETECTOR"** at ARC Centre of Excellence for Dark Matter Particle Physics Annual workshop, 2023.
- Winning Team member of VOGUE during Thomso'07 held at IIT, ROORKEE.
- Won several awards for Sketching at regional level, India.

TALKS

- Invited talk on **"Navigating Fellowships: How PhD Students Can Apply for Fellowships"** at Centre for Astrophysics & Supercomputing, Swinburne University of Technology, Australia (September 30, 2024).
- Contributed talk on **"Precision Weak lensing: Unveiling New Frontiers in Dark Matter Distribution"** at Keck Science Meeting, California Institute of Technology, Pasadena, United States (September 12-13, 2024).
- Sparkler on **"Investigating the Dark Matter Halos of Galaxies through Galaxy-Galaxy Lensing"** at Astronomical Society of Australia, Annual Science Meeting, Australia (June 24-28, 2024).
- Contributed talk on "Galaxy-galaxy lensing: Probing Dark Matter Surrounding Galaxies" at ACAMAR 10, Guangzhou, China (May 13-15, 2024).
- Invited talk on "Advanced Software Solutions for High-Contrast Imaging" at W. M. Keck Observatory HQ, Hawaii, USA (November 1, 2023).
- Invited talk on "Euclid Development Environment" in Euclid Developer's workshop 6 at ESAC/ESA, Spain (October 15-18, 2019).
- Contributed talk on "Wireless gesture driven robotic arm" in National conference on "Advances in Mechanical, Automobile & Production Engineering (AMAPE-2015)" at Skyline Institute of Engineering and Technology, Greater Noida, India (October 19-20, 2015).
- Lectures on "Design and Simulation of Pneumatics & Hydraulics systems and PLCs" (~8h) at AKGEC, Ghaziabad, India (2013-14)

LECTURES

- Lecture on "Data Modelling and Bindings" in Euclid Developer's workshop 7 (Virtually, October 5-8, 2020).
- Lectures on "C++ programming language" during Euclid Language workshop (~6h) at IAP, Paris, France (November 12-19, 2019).

SCIENTIFIC AND ADMINISTRATIVE RESPONSIBILITIES

- **Euclid:** Implementation lead of 2D-MASS-WL and in charge of the integration of the codes to produce the weak lensing mass maps, (2018-2021).
- Organisation workshops on Automation Studio (Design and Simulation of Pneumatics & Hydraulics systems and PLCs - 2013-14).
- Designed a course module for the Simulation of Pneumatics & Hydraulics systems and PLCs for Undergraduate students (2013-14).

PROFESSIONAL MEMBERSHIPS

- **Euclid (2018-2023).**
- **ARC Centre of Excellence for Dark Matter Particle Physics (2023-).**

SKILLS

- 10+ years of Programming experience in C/C++ (+98, +11 or higher and STL), Python, MATLAB, SQL, XML/XSD, bash
- 10+ years of Data Analysis Experience
- 10+ years of experience in Scientific computing
- Self-motivated and passionate for perfection and quality
- Ability to work independently and as a part of a team
- Excellent communication and organisational skills
- Trained and expert to work on different computer platforms like Windows, Linux, Mac etc.
- Capable of handling varied kinds of Microsoft packages like MS-Access, MS-Excel and other MS-Office software packages and other tools such as PyCharm, LabView, Qt, Eclipse, NetBeans, LaTeX, DipTrace, Automation Studio, Spenvis.
- Experience in open source developer tools such as gcc, cmake, gnu make, valgrind etc
- Extensively worked with Version Control Systems like GIT, SVN (Subversion)

DATA ANALYSIS

1. DATA:

- Multi-slit spectrographs (DEIMOS/KECK II)
- Integral field spectrographs (Image slicer: WiFeS/SSO-ANU 2.3; Lenslet: KOALA-AAOmega/AAT)
- Flagship data (Euclid)

2. STATISTICAL AND COMPUTATIONAL TECHNIQUES:

- Multi-Scale methods
- Bayesian inference methods
- Monte Carlo Methods
- Sparse representation

SELECTED PUBLICATIONS

- Nucita, A. A.; Conversi, L.; Verdier, A.; Franco, A.; Sacquegna, S.; Pöntinen, M.; Altieri, B.; Carry, B.; De Paolis, F.; Strafella, F.; Orofino, V.; Maiorano, M.; **Kansal, V.**; Vavrek, R. D. et at. arXiv:2501.05023
- Ajani, V., Baldi, M., Barthelemy, A., Boyle, A., Burger, P., Cardone, V. F., Cheng, S., Codis, S., Giocoli, C., Harnois-Déraps, J., Heydenreich, S., **Kansal, V.**, Kilbinger, M. et al. 2023 Astronomy Astrophysics, 675, A120
- **Kansal, V.**, et al. 2023, Astronomy Astrophysics, 670, A34m
- Pires, S., Vandenbussche, V., **Kansal, V.**, et al. 2020, Astronomy Astrophysics, 638, A141

CONFERENCE PROCEEDINGS

- **Kansal, V.** and Kansal, A.K., 2015. Wireless Gesture Driven Artificial Arm. ADVANCES IN MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING, p.37

CONFERENCES/WORKSHOPS

- "Train the Trainee Program" by Mitsubishi Electric at AKGEC.

- Basic Level Course of Industrial Automation conducted by Rexroth and Bosch at AKGEC
- FDP on Sensors and Transducers (on LAB View platform)