

Dr. Chunendra K Sahu

Birth: April 1987, Chhattisgarh, India | **Nationality:** Indian

Current position: Assistant Professor, IIT Kanpur (HWRE, Civil Engineering)

Email: cksahu@iitk.ac.in | **Webpage:** sites.google.com/view/cksahu



Profile summary

- **Background:** Postdoc - Cambridge | PhD - Alberta | ME - IISc | BE - BIT Durg | Work Ex - GE
- **Field:** Hydraulics and Water Resources | Environmental Fluid Mechanics | Flow in Porous Media
- **Research interest:** Plumes and gravity currents | Porous media and sub-surface flows | Dispersion in heterogeneous media | Carbon sequestration | Nuclear waste storage

Professional experience

- **Assistant Professor**, IIT Kanpur, India, since 2020.
- **Postdoctoral Fellow**, University of Cambridge, UK, 2017 – 2020.
- **Industrial Postdoc**, University of Alberta & SoilVision Systems Ltd, Canada, 2016 – 2017.
- **Edison Engineer**, General Electric, JFWTC Bangalore, 2011 – 2012.

Academic background

- **Postdoctoral Research Associate (2017–2019): University of Cambridge, U.K.**
Affls: Trinity College | The Institute for Energy and Environmental Flows
Supervisor: [Jerome A. Neufeld](#).
- **Doctor of Philosophy (2012–2016): University of Alberta, Canada**
Degree: Mechanical Engineering | Coursework result: 3.5/4.0 | Supervisor: [Morris R. Flynn](#)
Thesis title: Filling Box Flows in Porous Media [[pdf](#)]
- **Master of Engineering (2009–2011): Indian Institute of Science, Bangalore**
Degree: Mechanical Engineering | Grade: 6.0/8.0 | Supervisor: [G. S. V. L. Narasimham](#)
Thesis title: Simulation of an Automotive Air-conditioning System [[pdf](#)]
- **Bachelor of Engineering (2005–2009): Bhilai Institute of Technology, Durg**
Affiliation: Chhattisgarh Swami Vivekanand Technical University, Bhilai
Degree: Mechanical Engineering | Coursework result: 8.2/10.0
- **Secondary Education (1998–2005): Jawahar Navodaya Vidyalaya, Raipur**
Affiliation: Central Board of Secondary Education, New Delhi, India
Result: Grade 12th - 82.4% | Grade 10th - 85.6%

Academic awards and honors

- **FEIT Visiting Research Fellowship**, University of Melbourne, Australia, 2022.
- **Postdoctoral Fellowship in Mathematics and Natural Sciences**, University of Oslo, Norway, 2017–2020 (Not availed).
- **Roy Dean Hibbs Memorial Travel Award**, Institute for Geophysical Research, for 8th *Interpore*, Cincinnati, USA, 2016.
- **Roy Dean Hibbs Memorial Travel Award**, Institute for Geophysical Research, for 25th *CAN-*

CAM, London, Canada, 2015.

- **FGSR Travel Award**, University of Alberta, for *25th CANCAM* London, Canada, 2015.
- **Best Paper Award**, *2nd Intl. Joint Conf. on Advances in Engg. and Tech.*, Noida, India, 2011.
- **All India 6th Rank (AIR-6)** in **GATE 2009**, Mechanical Engineering.
- **1st Rank Holder** in 12th standard CBSE Board at JNV Raipur.
- **Silver Medal in National Mathematics Olympiad**, India, 2003.

Research funding

- IITK Initiation Grant, 2021 – 2023, Rs. 25 Lakhs.
- SERB Start-Up Research Grant, 2022 – 2024, Rs. 30 Lakhs.
- CE Departmental Grant, IITK, 2022 – 2025, Rs. 7.5 Lakhs (with P. N. Mishra and P. K. Ashish).

Research supervision

- Chetan Raturi (PhD, since 2020)
- Anoop Rathore (PhD, since 2022)
- Amita Singh (MTech, 2021–2023)
- Tarun Jain (MTech, 2021–2023)
- Sibashis Panda (Project Associate, 2022–2023)
- SURGE Interns 2022: Swati Kumari, Priyasha Das, Darshan Biswas.
- Summer Interns 2022: Khushbu, Kritika Bansal.

Teaching

- **CE611A: Advanced Hydraulics** (2 terms, IIT Kanpur, CE)
- **CE612A: Fluid Mechanics Laboratory** (1 term, IIT Kanpur, CE)
- **CE262A: Engineering Hydraulics** (2 terms, IIT Kanpur, CE)
- **CE341A: Civil Engineering Communication Skills** (1 term, IIT Kanpur, CE)
- **Course IA: Natural Science Mathematics** (Tutor, 1 term, U. Cambridge, DAMTP)
- **MecE 331: Fluid Mechanics** (TA, 2 terms, U. Alberta, Mech. Engg.)
- **MecE 390: Numerical Methods** (TA, 3 terms, U. Alberta, Mech. Engg.)
- **MecE 230: Intro. to Thermo-fluid Systems** (TA, 3 terms, U. Alberta, Mech. Engg.)
- **EnPh 131: Engineering Physics** (TA, 1 term, U. Alberta, Physics)

Administrative & professional activities

Administrative/volunteering roles:

- **Warden**, Hall 8, IIT Kanpur, since 2021.
- **Department Convener**, Senate Library Committee, IIT Kanpur, 2021–2023.
- **Member**, Department Undergraduate Committee, CE, IIT Kanpur, 2022–2023.
- **Advisory Committee Member**, *4th International Congress on Advances in Mechanical Sciences (ICAMS-2021)*, Hyderabad, 2021.

- **President**, Trinity Postdoctoral Society, Trinity College, U. Cambridge, 2019–2020.
- **Communications Officer**, Postdocs of Cambridge Society, U. Cambridge, 2018–2020.
- **President**, Mechanical Engineering Graduate Students Association, U. Alberta, 2014–2015 [\[url\]](#).
- **Vice-President Events**, ABCampus Students Group, U. Alberta, 2015.
- **Vice-President External**, MEGSA, U. Alberta, 2013–2014 [\[url\]](#).
- **Graduate Students Representative**, Dept. Council of Mech. Engg., U. Alberta, 2014–2015.
- **Department Representative**, Engineering Expo, Faculty of Engg., U. Alberta, 2014 & 2015.
- **Department Representative**, Graduate Student Association of U. Alberta, 2013–2014.
- **School representative**, Physics Model Exhibition, Cluster Level JNV Science Meet, Durg, 2003.
- **School representative**, Table Tennis Competition, Cluster JNV Sports Meet, Raipur, 2004.

Professional affiliations:

- **Journal reviews:** *Journal of Fluid Mechanics* • *Physical Review Fluids* • *Nature Scientific Reports* • *Water* • *Journal of Marine Science and Engineering* • *Fluid Mechanics and Fluid Power Conference*.
- **Membership:** *American Physical Society* (2018–2020) • *Interpore* (2016–) • *UK Carbon Capture and Storage Research Centre* (2017–) • *Indian Society of Heat and Mass Transfer* (2011–).

Other experiences

- **Consultant:** UASolve, Aircom Industries, Edmonton AB, 2015.
- **Consultant:** UASolve, IPA Ltd, Edmonton AB, 2015.
- **ME project:** Sponsored project by Mahindra & Mahindra Co, India, 2010 – 2011.
- **BE project:** Bhilai Steel Plant, Steel Authority of India Ltd, Bhilai, 2008.

Professional courses/training

- 14th BP-Schlumberger Masterclass in Energy Supply and Demand, U. Cambridge, 2018 (2 days).
- Scientific Writing, Researcher Development Programme (RDP), U. Cambridge, 2018 (1 day).
- Six Sigma Training, Edison Engineering Development Program, GE Bangalore, 2012 (5 days).
- CT-7 Familiarization Course, Jet Engine Tear Down School, GE Aviation, 2012 (5 days).
- A-level Certification, National Cadet Corps (NCC), Ministry of Defence, India (2 years).
- Annual Training Camp 2001 and Social Service Camp 2002, NCC 27 CG Bn, India (10 days each).

Publications

Journals (published)

- **C. K. Sahu** & J. A. Neufeld, 2023. Experimental insights into the gravity-driven flows and mixing in layered porous media. *Journal of Fluid Mechanics* 956, A27 [\[pdf\]](#).
- K. A. Gilmore, **C. K. Sahu**, G. P. Benham, J. A. Neufeld & M. J. Bickle, 2021. Leakage dynamics of fault zones: experimental and analytical study with application to CO₂ storage. *Journal of Fluid Mechanics* 931, A31 [\[pdf\]](#).
- K. S. Bharath, **C. K. Sahu** & M. R. Flynn, 2020. Isolated buoyant convection in a two-layered porous medium with an inclined permeability jump. *Journal of Fluid Mechanics* 902, A22 [\[pdf\]](#).

- **C. K. Sahu** & J. A. Neufeld, 2019. Dispersive entrainment into gravity currents in porous media. *Journal of Fluid Mechanics* 885, A5 1–22 [pdf].
- **C. K. Sahu** & M. R. Flynn, 2017. The effect of sudden permeability changes in porous media filling box flows. *Transport in Porous Media* 119, 95–118 [pdf].
- **C. K. Sahu** & M. R. Flynn, 2016. Filling box flows in an axisymmetric porous medium. *Transport in Porous Media* 112, 619–635 [pdf].
- **C. K. Sahu** & M. R. Flynn, 2015. Filling box flows in porous media. *Journal of Fluid Mechanics* 782, 455–478 [pdf].
- **C. K. Sahu** & G. S. V. L. Narasimham, 2012. Parametric studies of an automotive air-conditioning system. *Int. J. on Production and Industrial Engg.* 03, 27–30 [pdf].

Journals (forthcoming)

- **C. K. Sahu**, A. J. Butler, M. J. Bickle & J. A. Neufeld, 2022. The effects of heterogeneity on solute transport in porous media: Anomalous dispersion (In review).

Technical reports:

- **C. K. Sahu** & M. R. Flynn, 2017. Buoyancy-driven flow in porous media: validation of numerical models using novel theoretical results. Prepared for SoilVision Systems Ltd. (17 pages).
- Y. Agrawal, **C. K. Sahu**, M. Ashraful, S. Bhattacharya, D. Sen & B. A. Fleck, 2015. Evaluation of performance of BTB thermocouple. Prepared for Aircom Instrumentation (75 pages).
- D. Sen, **C. K. Sahu**, S. Bhattacharya & B. A. Fleck, 2015. Failure Testing of the IPA PAT Clamp. Prepared for IPA Ltd. (22 pages).

Conference proceedings (peer-reviewed and published):

- **C. K. Sahu** & J. A. Neufeld, 2023. The effects of vertical heterogeneity on gravity current flow in porous media. *67th Congress of Indian Society of Theoretical and Applied Mechanics (ISTAM)*, IIT Mandi, India [pdf].
- M. R. Flynn, M. A. Roes, **C. K. Sahu** & D. Bolster, 2016. Buoyant convection from a discrete source in closed and leaky porous media. *8th Int. Symp. on Stratified Flows*, San Diego, USA (8 pages) [pdf].
- **C. K. Sahu** & M. R. Flynn, 2015. Buoyancy-driven flows in a confined porous medium. *25th Canadian Congress of Applied Mechanics*, London, Canada (4 pages) [pdf].
- **C. K. Sahu** & G. S. V. L. Narasimham, 2011. Thermal rating of automotive condensers and evaporators. *21st National and 10th International ISHMT-ASME Heat and Mass Transfer Conference*, IIT Madras, India (6 pages) [pdf].
- **C. K. Sahu** & G. S. V. L. Narasimham, 2011. Parametric studies of an automotive air conditioning system. *2nd Int. Conf. on Advances in Engg. and Tech.*, Noida, India (4 pages) [pdf].

Conference abstracts:

- K. S. Bharath, **C. K. Sahu** & M. R. Flynn, 2020. Buoyant convection in porous media: Multiple layers separated by an inclined permeability jump. *12th Interpore: International Conference on Porous Media*, Online due to COVID19 [url].
- M. R. Flynn, **C. K. Sahu** & M. A. Roes, 2020. Buoyant convection from a discrete source in closed vs. leaky porous media. *12th Interpore: International Conference on Porous Media*, Online due to COVID19 [url].
- **C. K. Sahu** & J. A. Neufeld, 2019. Dispersive entrainment in gravity currents in layered porous media. *72nd Annual Meeting of APS-DFD*, Seattle, USA [url].

- K. S. Bharath, **C. K. Sahu** & M. R. Flynn, 2019. Buoyant convection in porous media: multiple layers with inclined permeability jump. *72nd Annual Meeting of APS-DFD*, Seattle [\[url\]](#).
- **C. K. Sahu**, M. J. Bickle & J. A. Neufeld, 2019. Mixing by dispersion in heterogeneous porous medium. *11th Interpore: International Conference on Porous Media*, Valencia, Spain [\[url\]](#).
- **C. K. Sahu** & J. A. Neufeld, 2018. Entraining porous media gravity currents *71st Annual Meeting of APS-DFD*, Atlanta, USA [\[url\]](#).
- K. S. Bharath, **C. K. Sahu** & M. R. Flynn, 2018. Buoyant convection in porous media: Multiple layers with inclined permeability jump. *71st Annual Meeting of APS-DFD*, Atlanta [\[url\]](#).
- M. R. Flynn & **C. K. Sahu**, 2017. The effect of sudden permeability changes in porous media filling box flows. *70th Annual Meeting of APS-DFD*, Denver, USA [\[url\]](#).
- **C. K. Sahu** & M. R. Flynn, 2016. Filling box flows in porous media, *23rd Canadian Symposium on Fluid Dynamics, CAIMS Annual Meeting*, Edmonton, Canada.
- **C. K. Sahu** & M. R. Flynn, 2015, Filling box flows in porous media. *8th Interpore: International Conference on Porous Media*, Cincinnati, USA [\[url\]](#).
- **C. K. Sahu** & M. R. Flynn, 2014. Study of buoyant plume in a confined porous medium, *21st Canadian Symposium on Fluid Dynamics, CAIMS Annual Meeting*, Saskatoon, Canada.

Invited and contributed talks

Invited talks:

- Dec 2022 – School of Infrastructure Engineering, **University of Melbourne, Australia**.
- Jul 2021 – BRICS NUs International Conference: WRPT 21, **NIT Durgapur** (Plenary talk).
- Aug 2021 – ATAL Faculty Development Program, **IIT Kanpur** (Invited lecture).
- Oct 2020 – Geophysical and Environmental Processes Seminar, **DAMTP, Cambridge** [\[url\]](#).
- May 2020 – BP Institute for Multiphase Flow Research Seminar, **BPI, Cambridge** [\[url\]](#).
- Feb. 2020 – Department of Chemical Engineering, **IIT Bombay, India** [\[url\]](#).
- Dec. 2018 – Fluid Dynamics and Multiscale Modelling Group, **Warwick, UK** [\[url\]](#).
- Mar. 2018 – BP Institute for Multiphase Flow Research Seminar, **BPI, Cambridge** [\[url\]](#).
- Mar. 2018 – Institute of Theoretical Geophysics Research Seminar, **DAMTP, Cambridge**.

Talks at international conferences:

- Nov. 2019 – *72nd Annual Meeting of APS-DFD*, **Seattle, USA**.
- May 2019 – *11th Interpore: International Conference on Porous Media*, **Valencia, Spain**.
- Nov. 2018 – *71st Annual Meeting of APS-DFD*, **Atlanta, USA**.
- Jun. 2016 – *23rd Canadian Symposium on Fluid Dynamics, CAIMS Annual Meeting*, **Edmonton**.
- May 2016 – *8th Interpore: International Conference on Porous Media*, **Cincinnati, USA**.
- Jun. 2015 – *25th Canadian Congress of Applied Mechanics*, **London, Canada**.
- Oct. 2015 – *Subsurface Carbon Storage Symposium*, **Calgary, Canada** (poster).
- Jun. 2014 – *21st Canadian Symposium on Fluid Dynamics, CAIMS Annual Meeting*, **Saskatoon**.
- Dec. 2011 – *21st National and 10th International ISHMT-ASME HMT Conference*, **IIT Madras**.
- Dec. 2011 – *2nd International Joint Conf. on Advances in Engg. and Technology*, **Noida, India**.

Talks at local conferences/symposia:

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- Mar. 2019 – *GeoCquest BHP Consortium*, **St. Catherine College**, Cambridge.
 - Mar. 2019 – *Trinity Science Symposium*, **Trinity College**, Cambridge.
 - Jul. 2018 – *NERC Consortium Highlights Meeting*, **U. Strathclyde**, Glasgow, Scotland.
 - Mar. 2018 – *Cambridge Centre for Climate Science Conference*, **U. Cambridge** (poster).
 - Mar. 2018 – *Institute of Theoretical Geophysics Research Seminars*, DAMTP, **U. Cambridge**.
 - Jun. 2016 – *7th Annual Graduate Research Symposium*, Faculty of Engineering, **U. Alberta**.
 - Oct. 2015 – *IGR Annual Graduate Student Symposium*, Inst. for Geophysical Research, **Alberta**.
 - Oct. 2014 – *IGR Annual Graduate Student Symposium*, **U. Alberta**.
 - Jun. 2014 – *5th Annual Graduate Research Symposium*, Faculty of Engineering, **U. Alberta**.
 - Oct. 2013 – *IGR Annual Graduate Student Symposium*, **U. Alberta**.