

Ajit Govind, PhD.

Research Scientist (Climatologist)
Water, Land and Ecosystems Program (WLEP)
International Center for Agricultural Research in the Dry Areas (ICARDA)
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Research Expertise

- Modeling of hydrometeorology-controlled biogeochemical processes in terrestrial ecosystems.
- Development of conceptualizations for eco-hydrological interactions at various scales.
- Physics and applications of remote sensing (RS) in the optical, thermal and microwave domains.
- Climate dynamics, climate impact on ecosystems, climate adaptation and mitigation.
- Upscaling biophysical processes across space and time using spatial data and numerical techniques.
- Spatio-temporal data analytics to understand effects of climate change, disturbance and/or management scenarios.

Academic History

PhD (RS-based Landsurface Modeling) [2008]: *Thesis-Spatially Explicit Modeling of Hydrologically Controlled Carbon Cycle in a Boreal Ecosystem.*

Dept. of Geography (Physical Geography).
University of Toronto, Canada.

MSc (Agricultural Physics) [2001]: *Thesis-Assessment of Nitrogen Stress from the Spectral Reflectance Behavior of Wheat Crop.*

Division of Agricultural Physics
Indian Agricultural Research Institute, India.

BSc (Agriculture) [1998]: *Project-Conservation Tillage: Its Philosophy, Feasibility and Cost Benefits in a Coastal Saline Agro-ecosystem in Karaikal Region.*

Tamil Nadu Agricultural University, India.

Work Experiences

1. Research Scientist (Climatologist), International Center for Agricultural Research in the Dry Areas (ICARDA), Cairo Centre, Egypt. (Sept. 2018-present). ICARDA's Focal point on CGIAR's -CCAFS initiative.
2. Associate Professor in Earth Sciences (March 2015-March 2018). A position offered under the Faculty Recharge Program of the Universities Grants Commission (UGC) of India. This position was chosen to be implemented at the University of Kerala, India.
3. *Chargé de recherche de 1^{ère} classe*, Senior Research Scientist, INRA, France (Oct 2013- present). From April 2015-March 2021 taken (1) deputation 2018-2021, possibly extendable until 2024 and (2) unpaid leave of absence 2015-2018 from the French Public Service to pursue item 1 and 2, respectively.
4. *Chargé de recherche de 2^{ème} classe*, Junior Research Scientist at INRA, France (Oct 2009-Oct2013). Tenured permanent staff and inducted into the French Public Service in 2010.

5. Postdoctoral Research Associate, Oregon State Univ, United States, *Ameriflux*-synthesis group (July 2008- Sept.2009).
6. Lecturer, University of Toronto, Dept. of Geography, Canada (January 2008- May 2008).
7. Research Assistant, the Canadian Carbon Program (March 2007-July 2008).
8. Research Assistant, the Fluxnet-Canada Project, Canada (September 2003-March 2007).
9. Graduate Research Assistant, University of Toronto, Canada (September 2003-March 2007).
10. Graduate Teaching Assistant, University of Toronto, Canada (September 2003- March 2008).
11. Research Personnel Indian Agricultural Research Institute, New Delhi (September 2001- August 2003).
12. Extension Personnel: Krishi Vigyan Kendra (*Agricultural Information Center*), (April 1999-August 1999).

Research Affiliations & Collaborations

- International Center for Agricultural Research in the Dry Areas (ICARDA), Globally located.
- Institut National de la Recherche Agronomique, France.
- University of Kerala, Trivandrum, India.
- Ameriflux Research Network funded by the US Department of Energy, USA.
- Canadian Carbon Program (Fluxnet-Canada), Universite Laval, Canada.
- Dept. of Geography, University of Leicester, UK.
- Dept of Geography, University of Toronto, Canada.
- Center for Global Change Science, Dept of Physics, University of Toronto, Canada.
- Texas AgriLife Research, Texas A&M University, USA.
- Canadian Forest Service (Laurentian Forestry Center, PQ, Canada).
- Hill-slope and Watershed Hydrology Lab, Oregon State University, USA.
- Division of Agricultural Physics, Nuclear Research Laboratory, IARI, India.

Honors & Awards

- Cheney Fellowship of Hydrology, Water@Leeds, Dept. of Geography, University of Leeds, UK (not pursued)
- Technical Advisor- Institute of Climate Change Studies, Govt. of Kerala, India.
- Honorary Visiting Fellow (2010-2015), Dept. of Geography, University of Leicester, UK.
- Founding Member, International Society of Agricultural Meteorology, 2008.
- Canadian Carbon Program Graduate Student Travel Grant, 2007.
- Centre for Global Change Science (Dept of Physics, U of Toronto) Graduate Student Award, 2006.
- Short-listed for Excellence in Teaching (TA/TP award U of Toronto), 2007.
- Fluxnet-Canada graduate student travel grant, 2006.
- University of Toronto Fellowship, 2003-2007.
- CSIR-UGC Junior Research Fellowship in Earth Science, 2003.
- Indian Agricultural Research Institute Fellowship-2001 (All India 2nd Rank).
- Indian Agricultural Research Institute Fellowship-1999 (All India 4th Rank).
- Nominated by the Indian Govt. for the Commonwealth Fellowship (UK) in Remote Sensing Tech., 2001.
- Awarded National Eligibility (Eligibility for Lectureship) in Earth, Oceanographic and Planetary Sciences, based on a national level examination conducted by the Council of Scientific and Industrial Research (CSIR), and Universities Grants Commission, India.

Publications

Articles Published in Refereed Journals

1. Athira, K., Sooraj, N. P., Jaishanker, R., Saroj Kumar, V., Sajeev, C. R., Pillai, M. S., **Govind, A**, and Dadhwal, V. K. (2019). Quantitative Representation of Floral Colors. *Color Research and Application*, (in press).
2. Athira, K., Sooraj, N. P., Jaishanker, R., Saroj Kumar, V., Sajeev, C. R., Pillai, M. S., **Govind, A**, Ramarao, N and Dadhwal, V. K. (2019). Chromatic exclusivity hypothesis and the physical basis of floral color. *Ecological Informatics*, 49, 40–44.
3. Kumari, J and **Govind, A** (2017), Greening trends of the Indian landmass, *Ecology, Environment & Conservation*, 23 (3),1605-1614.
4. Rawat, J.S; **Govind, A**; Rawat, G; Rai, S.P; Joshi, M and Gahlot, N (2016). Perennial to Ephemeral Transformation of a lesser-Himalayan Watershed, *Current Science* 111 (4), 686-694 (*shared first authorship).
5. **Govind,A**; Cowling, S; Kumari,J; Rajan, N and Al Yaari, A (2015). Distributed Modeling of Ecohydrological Processes at High Spatial Resolution Over a Landscape having Patches of Managed Forest Stands and Crop Fields in SW Europe. *Ecological Modeling*, 10.1016/j.ecolmodel.2014.10.019.
6. Pisek1,J; **Govind,A**; Arndt,S; Hocking,D; Wardlaw,T; Fang,H; Matteucci,G; Longdoz,B and Suarez,L (2015). Intercomparison of clumping index estimates from POLDER, MODIS, and MISR data over reference sites, *ISPRS J. Photogramm. Remote Sens.* 101, 47–56.
7. **Govind, A**. and Kumari, J.(2014). Understanding the Terrestrial Carbon Cycle: An Ecohydrological Perspective, *Int. Journal of Ecology*, Article ID 712537.
8. Al Yaari,A; Wigneron,J-P; Ducharne,A; De Rosnay,P; Kerr, Y ; De Jeu, R; **Govind,A**; Al Bitar, A; Albergel,C; Balsamo,G and (2014). Global-scale evaluation of two passive microwave satellite-based soil moisture datasets (SMOS and AMSR-E) with respect to modelled estimates. *Remote Sensing of Environment*. 149, 181-195, doi:10.1016/j.rse.2014.04.006.
9. Défossez,P; Richard,G; Keller,T; Adamiade,V; **Govind,A**; and Mary,B (2014). Modeling the impact of declining soil organic carbon on the soil mechanical strength: application to a cultivated Eutric Cambisol with massive straw exportation for energy production in Northern France. *Soil & Tillage Research*, 141, 44-54.
10. **Govind,A**; Guyon, D; Roujean, J-L; Yauschew-Raguenes, N; Kumari, J; Pisek, P; Wigneron, J-P (2013) Effects of Canopy Architectural Parameterizations on the Modeling of Radiative Transfer Mechanism. *Ecological Modeling*. 251(2013), 114-126.
11. **Govind, A** (2013). On the Nature of Canopy Illumination due to Differences in Elemental Orientation and Aggregation for Radiative Transfer. *International Journal of Biometeorology* (DOI: 10.1007/s00484-013-0769-1).
12. Wang, Z; Grant, R. ; Arain, A; Bernier, P; Chen, B; Chen, J; **Govind, A**.; Guindon, L; Kurz, W. A; Peng, C; Price, D. T; Stinson, G; Sun, J; Trofymow J. A. and Yeluripati, J. (2013) Incorporating Weather Sensitivity in Inventory- based Estimates of Boreal Forest Productivity: A Meta-analysis of Process Model Results. *Ecological Modeling* 260, 25-35.
13. **Govind, A**., Chen, J.M., Bernier, P.Y., Margolis, H., Guindon, L. and Beaudoin, A. (2011). Spatially Distributed Modeling of the Long-Term Carbon Balance of a Boreal Landscape. *Ecological Modeling*. 222(15), 2780-2795.
14. **Govind, A**., Chen, J.M., McDonnell, J, Kumari, J and Sonnentag, O. (2010). Effect of Lateral Hydrological Processes on Photosynthesis and Evapotranspiration., *Ecohydrology*.3. (doi: 10.1002/eco.141).

15. **Govind, A.**, Chen, J.M.; and Ju, W.(2009b). Spatially Explicit Simulation of Hydrologically Controlled Carbon and Nitrogen Cycles and Associated Feedback Mechanisms in a Boreal Ecosystem. *Journal of Geophysical Research*. 114, G02006, (doi: 10.1029/2008JG000728).
16. **Govind, A.**, Chen, J.M., Margolis, H., Ju, W., Sonnentag, O and Giasson, M.A. (2009a). A Spatially Explicit Hydro-ecological Modeling Framework (BEPS-TerrainLab V2.0): Model Description and Test in a Boreal Ecosystem in Eastern North America, *Journal of Hydrology*. 367:200-216. (doi:10.1016/j.jhydrol.2009.01.006).
17. Sonnentag, O; Chen, J.M; Roulet, N.T; Ju, W; and **Govind, A** (2008). Spatially Explicit Simulation of Peatland Hydrology and Carbon Dioxide Exchange: the Influence of Mesoscale Topography. *Journal of Geophysical Research* 113, G02005, (doi: 10.1029/2007JG000605).
18. Sonnentag,O; Chen, J.M; Roberts,D; Talbot, J; Halligan, K; **Govind A** (2007) Mapping Tree and Shrub Leaf Area Indices in an Ombrotrophic Peatland Using Field Measurements and Multiple End Member Spectral Mixture Analysis. *Remote Sensing of Environment*. 109:342-360.
19. Chen. J.M, **Govind,A**; Sonnentag,O; Zhang,Y; Amiro,B and Barr,A(2006): Leaf Area Index of Fluxnet Canada sites.*Agricultural and Forest Meteorology*.140:257-268.
20. Kumari.J, **Govind.A** and Govind.A* (2006): Entropy Change as Influenced by Anthropogenic Impact on a Boreal Land Cover-A Case Study. *Journal of Environmental Informatics* 7(2) 75-83. *Arun Govind, Univ. of Saskatchewan, Canada.
21. Kumari.J, Govind.A and Govind.A* (2006): Light Use Index: A Biophysical Index to Predict Plant Growth Parameters. *Journal of Agrometeorology* 8(2). *Arun Govind, Univ. of Saskatchewan, Canada
22. **Govind.A**; Bhavanarayana,M; Kumari.J, and Govind.A* (2005): Efficacy of Different Indices Derived from Spectral Reflectance of Wheat for Nitrogen Stress Detection. *Journal of Plant Interactions* 1(2):93-105. *Arun Govind, Univ. of Saskatchewan, Canada
23. **Govind,A** ; Bonnefond, J-M; Kumari,J; Moisy,C; Loustau,D and Wigneron,J-P (2012) , Modeling the ecohydrological processes in the Landes de Gascogne, SW France, *Proceedings of Plant Growth Modeling, Simulation, Visualization and Applications (PMA), 2012 IEEE Fourth Intl.Symposium*, vol., no., pp.133,140. (peer reviewed proceedings)
24. Regniers, O.; Govind, A.; Guyon, D.; Wigneron, J.; Baret, F., A multiscale and multisensor approach of LAI retrieval in a maritime pine ecosystem, *Geoscience and Remote Sensing Symposium (IGARSS), 2012 IEEE International*, vol., no., pp.1695,1698, 22-27 July 2012, doi: 10.1109/IGARSS.2012.635119 (peer reviewed proceedings)
25. **Govind, A.**, Guyon, D., Wigneron, J.-P. (2010). Effect of Canopy Architecture on Carbon and Water Fluxes: a numerical experiment. *Proceedings of LANDMOD 2010 - International Conference on Integrative Landscape Modelling, Montpellier, France*. (2010-02-03 - 2010-02-05). (peer reviewed proceedings)
26. Alyaari, A; Wigneron, JP.; Ducharne, A; Kerr, Y.; Al Bitar, A; de Jeu, R.; **Govind, A**; de Rosnay, P.; Albergel, C.; Munoz-Sabater, J., Performances of SMOS and AMSR-E soil moisture retrievals against Land Data Assimilation system estimates, *Microwave Radiometry and Remote Sensing of the Environment (MicroRad), 2014 13th Specialist Meeting* vol., no., pp.19,24, 24-27 March 2014 doi: 10.1109/MicroRad.2014.6878900 (peer reviewed proceedings)

Articles in Refereed Journals (in progress)

27. **Govind, A** (2019) Nitrogen Stress Detection in Wheat by Canopy Color Difference.
28. **Govind, A** (2019) Effects of Climate, Disturbances and Atmospheric Chemistry on the Long-term Carbon Cycle of a Boreal Landscape.

Articles in Preparation

29. **Govind,A;** and Pisek, J (201x) Effects of Canopy Architecture on Carbon and Water Fluxes: A Numerical Experiment. *Ecohydrology*. Status: manuscript is being written.
30. **Govind,A** (201x). Global Mapping of Vegetation Activity under Climate Change. Targeted journal: *Geophysical Research Letters*. Status: manuscript is being written
31. **Govind,A;** Law,B.E; Chen,J.M; Turner,D (201x). Long-term Carbon Balance of Oregon's Landmass under Disturbances, Changes in Atmospheric Chemistry and Climate. Targeted journal: *Global Biogeochemical Cycles*. Status: Research work completed, manuscript is being written.

Book Chapters

32. **Govind, A** and Chen,J.M (2009). Mapping of Terrestrial Carbon Sources and Sinks through Remote Sensing and Modeling. In: *Geoinformatics for Natural Resource Management*. Eds: Joshi,P.K; Pani,P; Mohapatra,S.N. Nova Science Publishers, Inc. ISBN:978-160692-211-8.
33. Abreu,M and others (2006). Chapter 8-: Weather Hazards to Forest and Non-Forest Trees.In Applications of meteorology to forestry and non-forest. In: *WMO/CaGM Guide to Agricultural Meteorological Practices (GAMP)*.Ed: Stigter,K; WMO, Geneva.
34. Kumari,J; **Govind,A** and Himashu Pathak (2003). International Initiatives on Combating Global Warming. In: *Soil and Greenhouse Effect, Monitoring and Mitigation*. Ed, H. Pathak and S. Kumar, CBS Publishers, New Delhi. pp 115-123.
35. **Govind, A** and Stigter, K (2009). The Sustainable Development and Use of Agro-ecosystems. In: *Applied Agrometeorology*. Ed, Stigter,K. Springer, Heidelberg/New York .
36. Stigter, K and **Govind, A** and (2009). Improving the Issuing, Absorption and use of Climate Forecast Information in Agricultural Production. In: *Applied Agrometeorology*. Ed, Stigter,K. Springer, Heidelberg/New York.

Conference Presentations /Seminars

1. **Govind, A** (2018). Terrestrial Carbon Cycle: Ecophysiology, Ecohydrology and Biogeochemistry. *Refresher Course in Environmental Science and Geosciences for College and University Teachers, UGC-Human Resources Development Centre, University of Calicut, 12th January2018, Calicut, India. (invited lecture)*.
2. **Govind, A** (2017). Earth Observation and Process Modelling to Understand Terrestrial Carbon Cycle. *National Seminar on Applications of Geospatial Technology in Geo-Environmental Research, Dept. Of Postgraduate Studies and Research in Geology, Govt. College Kasaragod, 19-20, Dec. 2017, Kerala, India (invited presentation)*.
3. **Govind, A** (2017). Some Scientific Aspects of Climate Change, *Two Day National Seminar on Recent Trends in Geosciences, University College, Thiruvananthapuram, Kerala, India, 22_23^h Nov2017 (invited presentation)*.
4. **Govind, A** (2017). Atmospheric Ozone Research: The State of the Art. *World Ozone Day Celebrations, SN College, Varkala, Kerala, 16th October 2017 (invited lecture)*
5. **Govind, A** (2017). Terrestrial Ecohydrology: Tandem use of Observations, Modeling and Remote Sensing to Understand its Complexity. *Texas Technological University, Lubbock, USA, 21th Aug 2017 (invited presentation)*.
6. **Govind, A** (2017). Opportunities and Constraints for Agricultural Climate Services in South Asia and Bangladesh: How can Research be translated into Partnerships and Projects to Benefit Farmers across the Scale? *The International Maize and Wheat Improvement Center (CIMMYT), 11th April 2017 (invited presentation)*.

7. **Govind, A** (2017). An Overview of Geographical Information Systems in Hydrology and Irrigation Systems. *Training Program on GIS imparted to officials in the Dept. of Irrigation, Government of Kerala. Institute of Management in the Government, Thiruvananthapuram, Kerala, 23rd January 2017 (invited lecture).*
8. **Govind, A** (2017). Wetlands and Global Change: *World Wetland Day Celebrations, Dept. of Environmental Sciences, St. John's College, 20th February 2017, Anchal, Kerala (invited lecture).*
9. **Govind, A** (2016). Climate Change and the Global Carbon Cycle. *Refresher Course in Environmental Science and Geosciences for College and University Teachers, UGC-Human Resources Development Centre, University of Calicut, 13th November 2016, Calicut, India. (invited lecture).*
10. **Govind, A** (2016). Role of Terrestrial Ecosystems in Climate Change: Tandem use of Observations, modelling and Remote Sensing to Explore their Complexities. *Centre for Ecological Studies, Indian Institute of Science, 25th November 2016, Bangalore, India. (invited lecture).*
11. **Govind, A** (2016). Role of High-latitude Wetland Ecosystems under a Changing Climate: *World Wetland Day Celebrations, Dept. of Environmental Sciences, University of Kerala, 2nd Feb 2016, Thiruvananthapuram, Kerala. (invited lecture).*
12. **Govind, A** (2015). Terrestrial Biogeochemical Cycle: Understanding the Complexity by the Synergistic Use of Modeling, Measurements and RS at Multiple Scales. *MARC 2015: Multi-Disciplinary Annual Research Conference, School of Earth Systems Sciences, University of Kerala, India (invited).*
13. **Govind, A** (2015). The Dynamics of the Atmospheric Ozone: *World Ozone Day. Kerala. World Ozone Day Celebrations, St. Gregorios College, Kottarakara, Kerala, 16th September 2015 (invited lecture)*
14. **Govind, A** (2015). Monitoring and Modeling Green House Gases in Livestock-dominated Landscapes, *International Livestock Research Institute, Nairobi, Kenya. 6th Nov 2015. (invited talk)*
15. Pisek, J.; He, L.; Chen, J.M; **Govind, A.**; Sprintsin, M.; Ryu, Y; Arndt, S.; Hocking, D.; Wardlaw, T.; Kuusk, J.; Oliphant, A.J.; Korhonen, L. and Fang, H; Matteucci, G; Longdoz, B; Raabe, K (2015). Characterization, validation and intercomparison of clumping index maps from POLDER, MODIS, and MISR satellite data over reference sites. *Geophysical Research Abstracts, Vol. 16, Vol. 17, EGU2015-3186, 2015, EGU General Assembly, Vienna, Austria.*
16. Champion, I and **Govind, A** (2014). Utilisation de données TerraSAR-X pour l'extraction de paramètres forestiers, Kalideos, des images pour la science (CNES), 7e Journée Utilisateurs Kalideos Littoral, Jeudi 4 septembre 2014, Station Marine-2, rue du Professeur Jolyet - Arcachon, France.
17. **Govind, A** (2014). A remote sensing-based SVAT modeling platform to simulate ecohydrological processes of pristine and managed ecosystems, *International Conference on Agriculture & Forestry - 2014, 10th - 11th June, Colombo, Sri Lanka. (Gold medal for best presentation).*
18. Al Yaari, A; Wigneron, J-P; Ducharne, A; Kerr, Y; De Jeu, R; Rosnay, P; **Govind, A**; AlBitar, A; Albergel, C; Sabater, J; Richaume, P and Mialon, A. (2014). Passive Microwave Remote Sensing (SMOS and AMSR-E) Datasets to Produce a Long-term Record of Soil Moisture. *Paper-WE2.02.3. Session-SMOS: Continuing to Provide Global Soil Moisture and Ocean Salinity Data II. IGARSS 2014 & 35th Canadian Symposium on Remote Sensing. 13-18 July 2014, Quebec, Canada. (invited).*
19. Al Yaari, A; Wigneron, J-P; Ducharne, A; **Govind, A**; Kerr, Y; AlBitar, A; De Jeu, R; Rosnay, P; Albergel, C; Sabater, J and Moisy, C. (2014). Global-scale Evaluation of Two Satellite-based Passive Microwave Soil Moisture Data Sets (SMOS and AMSR-E) with respect to modelled estimates. *Geophysical Research Abstracts, Vol. 16, EGU2014-56-2, 2014, EGU General Assembly, Vienna, Austria.*

20. **Govind, A;** Mosiy, C; Gaëtan, F; Wigneron, J-P and Running, S (2013). Incorporation of Soil Moisture Constrain to the Global GPP Product (MOD17A) a case study on the coterminous US. (2013). *Global Vegetation Monitoring and Modeling Meeting*, , February 2014, Avignon, France.
21. Pisek, J.; He, L.; Chen, J.M; **Govind, A.**; Sprintsin, M.; Ryu, Y; Arndt, S.; Hocking, D.; Wardlaw, T.; Kuusk, J.; Oliphant, A.J.; Korhonen, L. and Fang, H. (2013). Characterization, Validation and Intercomparison of Global Clumping Index Maps from Polder, Modis, And Misr Data. *Global Vegetation Monitoring and Modeling Meeting, February 2014, Avignon, France.*
22. **Govind, A.** (2013) Tandem use of Remotely Sensed Data and SVAT modeling to better understand Ecohydrological complexities at Multiple Scales, Nov 13, 2013, *Indo-French Focused Meeting on Water resources management using microwave remote sensing, Indian Institute of Science, Bangalore, India.*
23. Al Yaari,A; Wigneron,J-P; Ducharne,A; **Govind,A;** Moisy,C; AlBitar, A and Kerr, Y (2013). Global Inter-comparison of passive (SMOS) and active (ASCAT) surface soil moisture products with modeled surface soil moisture calculated by MERRA/land. *Satellite Soil Moisture Validation and Application Workshop, European Space Agency, 1-3 July 2013, Frascati, Italy.*
24. **Govind, A.** (2013) Multi-scale Modeling of Greenhouse Gas Fluxes in Diverse Terrestrial Ecosystems. *Royal Society International Scientific Seminar "Scaling Methods for Greenhouse Gas Fluxes in British Lowland Peatland"* (invited).
25. **Govind, A.** (2013) Understanding the Dynamics of Agricultural systems in the Semi-Arid tropics as Affected by Climate, market, Society and Disturbances. Use of Geospatial Analysis & Integrated Modeling at Multiple Scales (GAIM2). June 21, 2013, *ICRISAT, Hyderabad, India.*
26. **Govind, A.** (2013) Boreal Hydroecological Processes as Affected by Climate and Disturbances: Understanding the Complexity by Integrating Multiscale Measurements, Modeling and Remote Sensing. April 22, 2013, *Memorial University of Newfoundland, Corner Brook, New Foundland, Canada* (invited)
27. **Govind, A.** (2013) Terrestrial Ecohydrological Processes as Affected by Climate and Disturbances: Understanding the Complexity by Integrating Measurements, Modeling and Remote Sensing at Multiple Scales, April 19, *School of Environment & Natural Resources, The Ohio State University, Columbus, Ohio, USA.* (invited)
28. Moreaux,M; Bosc,A; Gu,J; Rabemanantsoa,T; Moisy,C; Guillot,M; Kumari,J; **Govind,A;** Wigneron,J-P; Guyon,D; Dayau,S; Ciais,P; and Loustau,D (2013) Modeling the variability in water and carbon fluxes over the 1990-2010 period in the Leyre water catchment in Les Landes de Gascogne forest: attribution to climate and management drivers. *Geophysical Research Abstracts. Vol. 15, EGU2013-12578, 2013, EGU General Assembly, Vienna, Austria.*
29. Al Yaari,A; Wigneron,J-P; **Govind,A;** Ducharne,A; Moisy,C; De Rosnay,P; De Jeu,R; Albergel,C; Balsamo,G and Kerr, Y (2013). Evaluation and intercomparison of SMOSL3, CCI, AMSER-LPRM, SMDAS2, and ERA Land soil moisture products, *European Space Agency SMOS Land Applications Workshop, Frascati, Italy. 25-27 February 2013.*
30. Al Yaari,A; Wigneron,J-P; **Govind,A;** Ducharne,A; Moisy,C; De Rosnay,P; De Jeu,R; Albergel,C; Balsamo,G and Kerr, Y (2013). Evaluation and Intercomparison of SMOSL3, AMSRE-LPRM, SM-DAS-2, and ERA-Interim/Land Soil Moisture products. *European Space Agency Living Planet Symposium 2013. Edinburgh, United Kingdom. 9 to 13 September 2013.*
31. Regniers, O, **Govind, A;** Guyon,D ; Wigneron, J-P ; Baret, F (2012) A multiscale and multisensor approach of LAI retrieval in a maritime pine ecosystem. *IGARSS 2012 Symposium (session titled: 'Canopy and Leaf Structure'). Munich, Germany (Oral Presentation + paper).*
32. **Govind,A;** Bonnefond, J-M; Kumari,J; Moisy,C; Loustau,D and Wigneron,J-P (2012) Distributed Modeling of Ecohydrological Processes in the Landes de Gascogne, SW. France, using the STEPS model. *2012 IEEE 4th*

33. **Govind,A**; Bonnefond,J-M; Bosc,A; Kumari,J; Guillo,M; Wigneron,J-P; and Loustau,D (2011). Ecohydrology of a maritime-pine dominated landscape in Southern France. *American Geophysical Union, Fall 2011 Meeting, Dec 2011, San Francisco, CA, USA (Oral Presentation).*
34. **Govind, A**; Kumari, J; Brown, M.E; Samalens, J.C; Wigneron, J.P; Myneni, R.B; Loustau, D; Lagouarde, J.P; Kathilankal, J and Guyon, D (2010) Global Trends in Vegetation Dynamics: Lessons Learned from 25 Years of Earth Observation from Space, *The 3rd International Symposium on Recent Advances in Quantitative Remote Sensing: RAQRS'III, Torrent, Valencia, Spain. 27th Sept -1st October 2010 (oral presentation).*
35. **Govind, A**; Guyon, D; Wigneron, J-P (2010) Effect of Canopy Architecture on Carbon and Water Fluxes: A Numerical Experiment. *LANDMOD 2010: International Conference on Integrative Landscape Modeling, February 3rd to 5th, 2010, SupAgro, Montpellier, France (poster presentation).*
36. Wigneron, J. P. ; Novello, N.; Kerr, Y.; Cabot, F.; Delwart, S.; Demontoux, F.; **Govind, A.**; Guyon, D.; E. Jacqueline, H.Lawrence, E. Lopez-Baeza, A. Mahmoodi, C. Mattar, Mecklenburg, S.; Mialon, A.; Moisy, C. ; Richaume, P. ; Saleh,K.; Schwank, M.; Sobrino, J.A. (2010) First evaluation of SMOS observations and L2 soil moisture products over a variety of biomes at global scale. *The 3rd International Symposium on Recent Advances in Quantitative Remote Sensing: RAQRS'III, 27 Sept- 1 Oct 2010 (oral presentation, paper).*
37. Bernier,P.Y; Wang, Z; Grant,R.F; Arain,A; Chen,B; Chen,J; Coops,N; **Govind,A**; Guindon,L; Hember,R; Kurz,W; Price,D.T; Stinson,G; Trofymow,T; and J. Yeluripati A model inter-comparison study of forest growth on two coastal and boreal forest landscapes in Canada. *AGU Spring Meeting, (Session-B06 CarboNA: Continental Carbon Cycle Studies in North America) 24-27 May, Toronto, Canada. (Invited Presentation).*
38. Chen, J. M; Ju,W; **Govind, A**; Sonnentag, O (2009). Coupling of Water and Carbon Cycles in Boreal Ecosystems at Watershed and National Scales. *AGU Spring Meeting, (Session-H08: Coupled Carbon, Water and Nutrient Cycling in Complex Terrain) 24-27 May, Toronto, Canada. (Invited Presentation).*
39. Wang, Z; Grant,R.F; Arain,A; Bernier,P.Y; Chen,B; Chen,J; Coops,N; **Govind,A**; Guindon,L; Hember,R; Kurz,W; Price,D.T; Stinson,G; Trofymow,T; and J. Yeluripati (2009) Intercomparisons of modeling the historic carbon balance and evaluating climate sensitivities in Western and Eastern forest landscapes of Canada. *8th International CO2Conference in Jena, Germany. -19 September 2009 (Poster Presentation).*
40. **Govind,A** and Chen, J. M (2009). A Spatially Explicit Modeling Approach to Capture the Hydrological Effects on Biogeochemical Processes in a Boreal Watershed, *AGU Spring Meeting (Session-H08: Coupled Carbon, Water and Nutrient Cycling in Complex Terrain) 24-27 May, Toronto, Canada. (Oral Presentation).*
41. Wang, Z; Grant,R.F; Arain,A; Bernier,P.Y; Chen,B; Chen,J; Coops,N; **Govind,A**; Guindon,L; Hember,R; Kurz,W; Price,D.T; Stinson,G; Trofymow,T; and J. Yeluripati (2009) Climate and Disturbance Effects on Forest Productivity in Oyster River and Chibougamau Study Areas. *2nd North American Carbon Program (NACP) All-Investigators Meeting. Feb 17-20, 2009. San Diego, CA. (Poster Presentation).*
42. **Govind,A**; Law,B.E; Chen,J.M; Turner,D (2008). Long-term Carbon Balance of Oregon's Landmass under Disturbances, Changes in Atmospheric Chemistry and Climate. *Ameriflux Annual General Meeting, Oct 2008, Boulder, CO, USA (Poster Presentation).*
43. Wang, Z; Grant,R.F; Arain,A; Bernier,P.Y; Chen,B; Chen,J; Coops,N; **Govind,A**; Guindon,L; Hember,R; Kurz,W; Price,D.T; Stinson,G; Trofymow,T; and J. Yeluripati (2008). Model Intercomparison: Disturbance Effects on Forest Productivity in Oyster River and Chibougamau Study Areas. *14th International Boreal Forest Research Association (IBFRA) Conference, september 22 -27 2008 in Harbin China (Poster Presentation).*

44. **Govind,A;** Chen,J.M; and Margolis,H (2007). Spatially explicit simulation of hydrologically controlled carbon and nitrogen cycles and associated feedback mechanisms in a boreal ecosystem in Eastern Canada. *American Geophysical Union, Fall 2007 Meeting, Dec 2007, San Francisco, CA, USA* (Conference Oral Presentation).
45. **Govind,A;** Bhavanarayana,M; and Kumari,J (2007). Simulation of Winter Wheat growth under different levels of Nitrogen using a process-based modeling approach. *ASA-CSSA-SSSA International Annual Meetings, Nov. 4-8, New Orleans, LA, USA.*
46. Wang,Z; Grant,R.F; Trofymow,T; Bernier,P.Y; Kurz,W; Stinson,G; Guindon,L; Chen,J.M; Arain, M.A; Peng,C; **Govind,A;** Yeluripati,J; and Sun, J (2007). Modeling of Spatial and Temporal Variabilities of Forest above Ground Biomass in Oyster River and Chibougamau Sites, Canada (poster presentation). *ASA-CSSA-SSSA International Annual Meetings, Nov. 4-8, New Orleans, LA, USA.*
47. **Govind,A;** Chen,J.M; Bernier,P.Y; Margolis,H; Ju,W; (2007). Linking long term and short-term modeling frameworks to reconstruct historical carbon balance at the Eastern Old Black Spruce site. *5th Annual General Meeting of the Fluxnet Canada Research Network, Ottawa, Ontario, Canada, February 2004.* (Poster Presentation).
48. Wang,Z; Grant,R.F; Trofymow,T; Bernier,P.Y; Kurz,W; Stinson,G; Guindon,L; Chen,J.M; Arain, M.A; Peng,C; **Govind,A;** Yeluripati,J; and Sun,J (2007). Modeling of Temporal Variability of Forest above Ground Biomass in Oyster River and Chibougamau Sites, *FCRN General Meeting, Ottawa* (Poster presentation).
49. **Govind,A;** Chen,J.M; Margolis,H; Bernier,P.Y; (2006) Topographically driven lateral water fluxes and their influence on carbon assimilation of a black spruce ecosystem. *American Geophysical Union, Fall 2006 Meeting, Dec 2006, San Francisco, CA, USA* (Conference Oral Presentation).
50. Wang,Z; Grant,R.F; Trofymow,T; Bernier,P.Y; Kurz,W; Stinson, G; Guindon,L; Chen,J.M; Price, D and **Govind, A** (2006) Grid-based Modeling of Temporal and Spatial Variability of Forest Carbon Fluxes at Oyster River Watershed and Chibougamau Site (poster presentation). *American Geophysical Union, Fall 2006 Meeting, Dec 2006, San Francisco, CA.*
51. **Govind,A;** Chen,J.M; Margolis,H; Bernier,P.Y; Ju,W; Beaudoin,A; Guindon,L (2006) Modeling the carbon and hydrological cycles in a black spruce-moss dominated ecosystem in boreal eastern Canada. (Conference Oral Presentation). *40th Congress of Canadian Meteorological and Oceanographic Society, Toronto, May 29th - June 1st, 2006.*
52. **Govind,A;** Chen,J.M; Margolis,H; Bernier,P.Y; Ju,W; Beaudoin,A; Guindon; Giasson,MA. (2006) Coupled Carbon and Hydrological Cycle Modeling at Watershed Scale at the eastern Old Black Spruce Site of FCRN in 2004. *4th Annual General Meeting of the Fluxnet Canada Research Network, Victoria, British Columbia, Canada, February 2006.* (Poster Presentation).
53. Chen, J.M., Ju, W., **Govind, A.**, Sonnentag, O., Chen, X. El-Maayar, M. (2004). Modeling hydrological and carbon cycles at tower sites and upscaling from site to region (poster presentation). *2nd Annual General Meeting of the Fluxnet Canada Research Network, Banff, Alberta, Canada, February 2004.* (Poster Presentation).
54. **Govind,A;** Bhavanarayana,,M; Gupta,V.K; Tomar,R.K(2001) Comparative Study of Broad band and Hyperspectral Indices as an Indicator of Nitrogen Stress in Wheat Crop. *National Symposium on Advances in Remote Sensing Technology with Special emphasis on High Resolution Imagery, organized by Indian society of Remote Sensing (ISRS), Ahmedabad.* (Oral Presentation + paper).
55. **Govind,A;** Bhavanarayana (2003)Quantification of Nitrogen Stress Using La*b* Color System. *2nd International Congress on Plant Physiology, Indian Agricultural Research Institute, New Delhi.* (Poster Presentation).

Teaching Experience

1. Geoinformatics, Spring 2016, 2017, U of Kerala, India.
2. Meteorology, Summer 2016, 2017, U of Kerala, India.
3. Climatology, Summer 2016, U of Kerala, India.
4. Remote Sensing & Geoinformatics, Summer 2016, U of Kerala, India.
5. Environmental Meteorology and Climate Change, Summer 2015, U of Kerala, India.
6. Environmental Chemistry, Summer 2015, U of Kerala, India.
7. Remote Sensing and GIS, Summer 2015, U of Kerala, India.
8. Regional Hydrologic Modeling, Winter 2009 (co-teaching), Biological Engineering, OSU, USA.
9. Soil and water: Landscape Processes, Winter 2008 (course coordinator), U of T, Canada.
10. Environmental Remote Sensing, Winter 2008, U of T, Canada.
11. Introduction to Hydrology, Summer 2007 (Guest Lecturer), U of T, Canada.
12. Environmental Remote Sensing, Winter 2007, U of T, Canada.
13. Introduction to Hydrology, Fall 2006, U of T.
14. Introduction to Soil Science, Summer 2006, U of T.
15. Introduction to Physical Geography, 2005- 2006, U of T.
16. Introduction to Hydrology, Fall 2005, U of T.
17. Introduction to Climatology, Winter 2005, U of T.
18. Geographic Information System and Mapping, Fall, 2004, U of T.
19. Geographic Information System and Mapping, Winter 2003, U of T.
20. Water Resource Management, Water Technology Centre, IARI, India.

Mentoring / Supervising Undergraduate, Graduate & Postdoctoral Researchers, Thesis Examiner Assigns.

- Nathalie Yauschew-Raguenes, a Ph.D. student at the Univ. of Bordeaux-II (2009-2014). Thesis Title: Carbon balance of Aquitaine Maritime pine forest ecosystem: integration of remote sensing data into a process model of forest productivity (mentor). *Graduated*.
- Olivier Reginiers, Masters Student, at the Univ. of Bordeaux-III (2010-2011). Thesis Title: Mapping of biophysical parameters over the Landes de Gascogne using ground-based measurements and high-resolution RS data (primary supervisor). *Graduated*.
- Marie Guillot, a Ph.D. student at the Univ. of Bordeaux II (2009-2013) Thesis Title: Water and carbon balance in the the Leyre river catchment (mentor). *Graduated*.
- Amen Al Yaari, a Ph.D. student at the Univ. of Pierre and Marie Curie (2011-2015). Thesis Title: Spatial Analysis of the different soil moisture products at the global scale (mentor). *Graduated*.
- Jyothi Kumari, Postdoctoral Scientist (2009-2011), Research project [FAST]: Further development of the GRAECO model for generalized applications. FAST-Fonctionnement éco-hydrologique à fine échelle de la forêt landaise et vulnérabilité de l'ancrage mécanique racinaire des arbres pour différents scénarios intégrés 2010-2050.
- Pierre-Yves Caneill, a 3rd year computer engineering student from the Bordeaux Institute of Technology (ENSEIRB-MATMECA) (2010-2011). Engineering Dissertation Title: Improving the computational efficiency, dataflow, GUI improvement of the STEPS model (primary supervisor). *Graduated*.
- Gaëtan Fauvre, a 2nd year electrical engineering student from the Bordeaux Institute of Technology (ENSEIRB-MATMECA): Modifying the MODIS GPP algorithm (MOD17A): Explicit incorporation of soil moisture effects on terrestrial primary productivity (primary supervisor). *Graduated*.

- Adheena A.S, Masters Student, at the Univ. of Kerala (2015-2017). Thesis Title: Urbanization-induced Heat Island Generation in the Thiruvananthapuram city (primary supervisor). *Graduated*.
- Kavya Jayakumar, Masters Student, at the Univ. of Kerala (2015-2017). Thesis Title: Mapping of Leaf Area Index in a Humid Tropical Ecosystem in SW India (primary supervisor). *Graduated*.
- Thejesy, A. Masters Student, at the Univ. of Kerala (2015-2017). Thesis Title: Hydrology-influenced Landscape Characteristics: A Comparison between Earth and Mars (primary supervisor). *Graduated*.
- Varun, S. Masters Student, at the Univ. of Kerala (2016-2018). Thesis Title: Geometry and kinematics across main boundary thrust (MBT) near north of Dehradun, Uttarakhand, India: A Structural Analysis and Interpretation of Geomorphic Markers on the Hanging Wall Block of MBT (primary supervisor). *Graduated*.
- Masoud Abdollahi (2019). Remote sensing of forest fire danger forecasting. PhD thesis. Dept. of Geomatics Engineering, and Centre for Environmental Engineering Research and Education, University of Calgary, Alberta, Canada. (External Examiner).

Involvement in Research Projects (Fund Raising Efforts)

Successful Grant Applications

1. Abril, G; Govind,A and Mollier, A (2013).
CNP-Leyre: Dynamique du carbone de l'azote et du phosphore à l'interface terrestre aquatique dans le bassin de la Leyre (In English) CNP-Leyre. Dynamics of Carbon, Nitrogen and Phosphorous at the terrestrial-aquatic interface of the Leyre watershed.
Funding Agency: Labex COTE-Cluster of Laboratories of Excellence: Continental to Coastal Ecosystems, Amount: ~\$248,500 (186,000 €)
2. Lafon, V; Dehouck,A; Govind,A; Guyon,D; Lubac,B and Wigneron, J-P (2013)
SPOT-4 (Take Five) Préparation de la mission Sentinel-2 en Aquitaine par le réseau STELLA : contribution à la compréhension des phénomènes naturels évolutifs pour la gestion de l'environnement et la prévention des risques. (In English) Preparation of the Sentinel-2 mission in Aquitaine by the STELLA network: contribution to the understanding of various natural phenomena for the management of the environment and risk prevention. Supporting Agency : National Center for Spatial Studies [CNES], France, SPOT-4 (Take Five) Program Amount: Free supply of SPOT-4 data from Feb 2013 to May2013 at 5 days intervals.
3. Hagolle, O ; Dedieu, G; Dejoux, J-F ; Duchemin, B ; Huc, M ; Inglada, J ; Demarez V ; Gascoin,S ; Laurence, H-M ; Thomas, C ; Samuel,C ; Lacherade,S ;Meygret,A ; Dominique,C ; Baret,F ; Oliso,O ; Jacob,F ;Prevot,L ;Lhomme, J-P; Guyon,D; Govind,A ;Therond,O ; David, S; Reynaud,A; Houet, T; Sabine,S; Serge,R ; Dessay,N; Deshayes, M ; Marlène L-F ; Corinne, L-M; Marielle, J (2011) Traitement et applications de séries temporelles d'images LANDSAT pour préparer l'utilisation de VENμS et SENTINELLE-2. (In English) Image Analysis & Applications of LANDSAT Data in Preparation for the VENμS and SENTINELLE-2 Satellite Missions.
Funding Agency: National Center for Spatial Studies [CNES], France, TOSCA Program
Amount: ~\$200,369.00
4. Wigneron, J-P; Guyon,D; Champion,I; Lagourade,J-P; Moisy,C; Dayau,S; Kruszwski,A; Loustau,D; Germain,Ch; DaCosta,J-P; Grenier,G; Lavialle,O; Boukir,S; Chehata,N; Govind,A; Lafon,V; Lubac,B;Anschutz,P; Canton,M; (2011). Projet STELLA: Caractérisation de la dynamique spatiale et temporelle des changements majeurs affectant le fonctionnement et la durabilité des écosystèmes sur le site atelier télédétection Aquitain. (In English) Projet STELLA:Spatio-temporal Characterization of the Dynamics of the Major Factors affecting the Functioning and Sustainability of Ecosystems in the Aquitaine Region using Remote Sensing. Funding Agency: France.

Amount: ~\$356,206.00* (250,000 €)

5. Govind, A; Roujean, J-L; Guyon, D and Wigneron, J-P (2013). Mapping of biophysical parameters at high spatial and temporal resolutions for ecohydrological modeling applications in the Landes de Gascogne: Development of methodologies for landsurface applications in preparation for the Sentinel-2 mission.
Funding Agency: National Center for Spatial Studies [CNES], France, TOSCA Program
Amount: ~\$21,369.00 (15,000 €)
6. Department of Geology, University of Kerala (drafted by Govind, A) (2016). A Proposal for Establishing an Earth Systems Modeling Certificate Course.
Funding Agency: University of Kerala, Director of Planning and Development
Amount: ~Rs. 8,00,000
7. Department of Geology, University of Kerala (drafted by Govind, A) (2017). Proposal for Establishing a Meteorological Observatory at the Karyavattom Campus.
Funding Agency: University of Kerala, Director of Planning and Development
Amount: ~Rs.30,00,000
8. Department of Geology, University of Kerala (drafted by Govind, A) (2017). Proposal for Conducting a Series Field Workshops (tapping the presence of International Experts)
Funding Agency: University of Kerala from the Chancellor's Award Share
Amount: ~Rs. 2,00,000.
9. "Measures to Adapt to Climate Change" component of the project entitled "Iraq: Preparation of the Second National Communication (SNC) and Biennial Update Report (BUR) to the UNFCCC (Govind et al. 2018).
Funding Agency: United Nations Environment Program.
Amount: 96,000 USD.
10. Climate-resilience and water productivity for agriculture in Arab countries (Govind et al. 2018). ICARDA proposal to be implemented in Morocco, Tunisia, Egypt, Jordan, Sudan and Palestine along with national partners.
Funding Agency: Arab Fund for Economic and Social Development (AFESD).
Amount: US\$ 3.23 million. *(in review, high probability of funding)*
11. Establishing and Operating a Regional Network for Field Measurements of Actual Crop Water Consumption (Evapotranspiration) (Swalem, et al., 2018).
Funding Agency: Food and Agricultural Organization of the United Nations (FAO)
Amount: US\$ 678,893

Unsuccessful Grant Applications

1. Lapsidou et al. (2014) FELUCCA Project: Land-atmosphere Feedbacks in the European water cycle driven by Land Use Changes, HORIZON 2020, Program, Water Innovation: Boosting its Value for Europe. Priority Area, WATER-2a-2014: Water cycle under climate. Funding Agency: European Commission
Amount: 6865, 000 € to be distributed among PIs.
2. Balzter et al. (2014). CLEOPATRA Project. Copernicus Land and Emergency Observations Partnership for Transnational Research Applications.
Call: H2020-MSCA-ITN-2014
Funding Agency: European Commission
3. Cohen et al. (2012) MANFOREST: Management to increase mitigation capacity of European forests. Largcollaborative Project [FP-7] KBBE.2012.1.2-07: Development of management strategies for planted and managed forests to increase mitigation capacity

Funding Agency: European Commission
Amount: 900,000 € to be distributed among PIs

4. USDA (AFRI)-NIFA Grant
Rajan,N; Ale,S; Gentry,T; Govind,A; Maas,S (2011).Carbon and Nitrogen Dynamics and its Implication on Microbial Processes and Greenhouse Gas Emissions in Agro- Ecosystems of the Texas Plains. USDA-NIFA-AFRI-003397
Funding Agency: Agriculture and Food Research Initiative (AFRI), USDA, USA.
This was an overseas project where in, I was involved as a “external collaborator” with no financial benefits to INRA. However, the involvement was intended for student and postdoc visits to EPHYSE, collaborative papers and sharing of the STEPS model with Texas A&M Univ.
5. Govind, A and Mukhortova, L.V (2015) Potential for Carbon Sequestration of Cryogenic Ecosystems. Indo-Russian Bilateral Research Program
Funding Agency:DST (India) and RSF (Russian Science Foundation)
Amount: ~Rs.1,70,00,000 (India) and ~Rubles.1,80,00,000(Russia).

Technical Skills

(i) Computer Programming

1. C language (advanced and fluent), R language (use daily), Python (occasionally).
2. Experience in FORTRAN, MATLAB (limited).
3. Operating Systems Windows XP, 7, 8, 10, Linux (Ubuntu, Fedora, Debian, Linux Mint).

(ii) Numerical Models Developed

1. *BEPS-TerrainLab V2.0*. A remote sensing-based model for predicting water and carbon cycles in Boreal ecosystems (Govind *et al.*, 2009 a, b). This numerical model was developed in C language and has sophisticated formulations and a user-friendly interface for the Windows environment.
2. *SpecAnalyser*: A model to calculate ratio and orthogonal spectral indices from hyperspectral reflectance data. This is a model that calculates all the conventional spectral indices from hyperspectral remote sensing data. It can be applied either on ground-based hyperspectral data (spectroradiometer) or satellite-borne hyperspectral data (e.g. Hyperion). This model was developed in C language in console mode.
3. *Carbepsilon*: A framework for regional scale modeling of Carbon fluxes from multi-temporal satellite data. This is an algorithm that computes various types of terrestrial C fluxes (GPP, NPP) based on a modified form of MOD17A2 algorithm. It can be applied to satellite data of any spatial resolution including MODIS. The calculation is based on the light use efficiency approach. This model was developed in C language in console mode.
4. *STEPS (Simulator of Terrestrial Ecohydrological Processes and Systems)*: A generic remote sensing-based Distributed eco-hydrological model for predicting coupled C, Water, Energy, N and P cycles in both pristine and managed ecosystems (Govind *et al.*, 2015). It was developed in C language having sophisticated formulations and a user-friendly interface. It is usable in both Windows and Linux (for high-performance computers) environments.

(iii) Geospatial Data Analytics

1. Expertise (high level) in Remote Sensing & GIS Packages viz. ArcGIS, PCI Geomatica, ENVI, ERDAS, SAGA GIS, SV-SIG, Orfeo-Toolbox, GDAL and QGIS, R-packages (raster, rgdal, netcdf4).
2. Hands on experience (high level) with usage and development of biophysical models for terrestrial ecosystems such as *InTEC*, *BEPS*, and *BEPS-TerrainLab V1.0* and *BEPS-TerrainLab V2.0* for predicting regional and point scale biogeochemical and ecohydrological processes.

3. Knowledge in Spectral Reflectance measurement and analysis using Field Spec ASD and LICOR-1800.

(iv) Instrumentation Skills

1. Expertise in setting up meteorological observatory and meteorological instrumentation, calibration and maintenance.
2. Expertise in measurement and modeling of Canopy Radiative Transfer Mechanism using Digital Hemispherical Photography, LAI-2000, TRAC and the related instrumentations.
3. Hands on experience in using instruments for various types of hydrology-related studies: surface hydrology (runoff measurements, Evapotranspiration, watershed analysis), vadose zone hydrology (soil moisture and soil suction using TDRs, pressure plate, neutron probe) and phreatic zone hydrology (water table depth dynamics using water level loggers).
4. Hands on experience in measuring the turbulent energy and mass fluxes (CO_2 , CH_4 , H_2O , H fluxes) in the atmospheric boundary layer using micrometeorological techniques (eddy covariance) and chambers. Attended a week-long training program offered by LICOR Biosciences, Nebraska, USA, held at Universität für Bodenkultur, Wien, Austria.

(v) Field Campaigns

1. Chibougama, Quebec, Canada (Summer 2004) Measurement of LAI and parameters of canopy radiative transfer in a Black Spruce ecosystem in Eastern Canada-I. Role: team leader, participants 5.
2. Mer Bleu Bog, ON, Canada (Summer 2004) Measurement of LAI and landcover characteristics in an ombrotropic peatland in Eastern Canada, Mer Bleu Bog, Ottawa. Role: co-team leader, participants 5.
3. Campbell River, BC, Canada (Fall, 2005) Measurement of canopy clumping index, LAI and leaf spectral reflectance in Douglas Fir stands of various age classes. Role: co-team leader, participants 4.
4. Chibougama, Quebec, Canada (summer 2005) Ground validation of RS-derived landcover, LAI and soil hydraulic parameters in a Black Spruce stand in Eastern Canada. Role: team leader, participants 5.
5. Nashwak Lake, New Brunswick, Canada (2006) Measurement of canopy clumping index, LAI and leaf spectral reflectance in a Balsam Fir stands of various age classes in Acadian Forests. Role: co-team leader, participants 4.
6. Prince Albert, SK, Canada (Fall, 2006) Studying the carbon fluxes in Boreal landscapes of Central Canada. Role: team member, participants 40.
7. Metolius and Bend, OR, USA (Fall, 2009) Ground validation/ground truthing of Landsat ETM-derived landcover, landuse and LAI variability in the Cascades Mountain Ranges of Pacific North West. Role: team member, participants 3.
8. Landes de Gascogne, Aquitaine, France (Year-round 2012, 2013, 2014) Ground validation/ground truthing of SPOT-4 - derived landcover/landuse, LAI, canopy clumping variability in the Landes de Gascogne (Leyre watershed) region, South West France. Role: team leader, participants 5.

Leadership and Resource Mobilization Skills

1. Nature Club Secretary (1997), Pandit Jawaharlal Nehru College of Agriculture, Karaikal, Pondicherry, India. In this role, I was responsible to plan and execute several field trips and programs relevant to environmental consciousness. These programs were implemented liaising with local nature/environmental stakeholders like the Govt. Dept. of Forestry, Dept. of Agriculture etc.
2. Batch Representative (1994-1998), Pandit Jawaharlal Nehru College of Agriculture, Karaikal, Pondicherry, India. In this role, I was responsible for organizing various student activities pertaining to the batch as a whole consisting of 50 students. In

this position, I used to arrange printing academic manuals, arrange for field and tour tickets, represent for student grievances etc.

3. Future Studies & Placement Cell Secretary (1998), Pandit Jawaharlal Nehru College of Agriculture, Karaikal, Pondicherry, India. In this role, I was responsible to plan and execute various career orientation programs relevant to agricultural graduates. These programs were implemented by inviting professionally-successful individuals in various domains to give lectures and to interact with the students.
4. Field campaign leader to measure LAI and vegetation dynamics across Canada. I was responsible to plan the whole field campaign program that consisted of various locations across Canada. I was also responsible to design the measurement transects, design the protocol, time management, ensure data quality and archival and following, this meticulously analyze the data and produce a report. Significant amount of human resource management was also involved in this.
5. STEPS modelling project. This was a part of the research program that I have been involved during the past several years, where in a remote sensing-based modeling platform was developed. It started as early as 2003 as a part of my PhD program. I was responsible (in 2003) to guide two computer programmers (Andriy Bulynkow and Mark Mortimer) to design the GUI and implement the coding activities. I myself also did a significant amount of coding on both the scientific and interface parts of the project. Since 2009, substantial amount of work was devoted to making it compatible with the Linux environment to exploit the power of supercomputing machines that run on Linux. In this regard, I was leading a team of 4 people who included software engineers, research engineers and graduate student scientists (namely, Pierre-Yves Caneill, Gaëtan Fauvre, Amen Al Yaari, Jyothi Kumari and Christophe Moisy).
6. Course coordinator. I have coordinated several semester-long graduate courses in various universities in Canada, USA, France and India. All these required some amount of leadership and management skills. In most of these courses I have to manage a group of people (TAs) to design the labs and tutorials, prepare lecture materials, set the examination paper, prepare the grade sheet etc. It involves substantial amount of human, time and resource management skills. Examples of the conventional courses that I have coordinated can be seen in the section "Teaching experience". Of late, I have been leading a series of 4-5 days-long certificate courses at the University of Kerala on various aspects of Free and Open Source Geoinformatics Software. One such is entitled "*Workshop on Free & Open Source GIS using QGIS, 26-29 September 2016, Karyavattom, India.*"

Research Community Services

- Reviewer of several peer-reviewed journals.
- ICARDA focal point on Climate Change, Agriculture and Food Security (CCAFS) project of CGIAR.
- Chair for ICARDA Community of Practices on Systems Analysis and Simulation in Agriculture.
- Technical Advisor- Institute of Climate Change Studies, Govt. of Kerala, India.
- NSERC [Natural Sciences and Engineering Research Council of Canada] Proposal Reviewer.
- Served as academic referee for undergrad students (seeking graduate school admissions) and peers (seeking academic positions/ grant support letters).
- Academic Editor, PlosONE.
- Editorial Board Member, Agronomy.
- Editorial Board Member, Emirates Journal of Food and Agriculture
- Editorial Board Member, Ecology: An International Journal
- Editorial Board Member, International Journal of Global Agriculture and Ecology.
- Shastri Faculty Training and Internationalization Grant (SFTIG) program Adjudication Committee 2017-18, Shastri. Indo Canadian Institute

Personal Details

- Nationality Indian
- DOB 30-05-1977
- POB Thiruvalla, Kerala, India
- Language skills English (fluent), French (medium), Hindi (fluent), Tamil (medium), Malayalam (fluent)