

# DEEPAK K. GUPTA

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## EDUCATION

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**Delft University of Technology, The Netherlands**  
PhD in Computational Science

*Sep 2013 - Present*

**Indian Institute of Technology (ISM) Dhanbad, India**  
Integrated (5 yr.) M.Sc. Tech. in Applied Geophysics  
Overall GPA: 8.48/10 (Director's Gold Medal)

*July 2008 - May 2013*

## RESEARCH INTERESTS

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Application of advanced computational methods to solve challenging real world problems (mathematical optimization, topology optimization, finite element analysis, high performance computing and computational geophysics) .

## EXPERIENCE

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**Faculty of 3mE, Delft University of Technology**  
*Researcher*

*Sep 2013 - Present*  
*Delft, The Netherlands*

- Involved in the development of efficient adaptive multiresolution topology optimization methods.
- Developed a novel 2D finite element model for solar cell front metallization and currently involved in developing novel busbar layouts and superior electrode designs.
- Proposed an optimization strategy for the optimization of front and rear metallizations of free-form solar cells.

**EarthByte Group, University of Sydney**  
*Visiting Researcher*

*Dec 2012 - Jan 2013*  
*Sydney, Australia*

- Worked in the group of Prof. Dietmar Muller and added a plate rotation utility in the *GPlates* software.

**Schlumberger Asia Services Ltd.**  
*Summer Intern*

*June 2012 - July 2012*  
*Dehradun, India*

- Worked on automated correlation of well logs and identification of lithological units.
- Implemented the algorithms using C# and Ocean API as a plugin for *Petrel* software.

**National Geophysical Research Institute**  
*Visiting Researcher*

*June 2011 - July 2011*  
*Hyderabad, India*

- Used various rock physics models to analyze the gas hydrate and free-gas saturations at 3 sites of Krishna-Godavari (KG) basin, India.
- Proposed an empirical velocity-porosity transform for the KG basin sediments.

**National Centre for Ocean and Antarctic Research**  
*Trainee*

*Dec 2009 - Jan 2010*  
*Vasco-da-Gama, India*

- EEZ survey of the Arabian Sea under the SK-266 project of the ORV Sagarkanya vessel.
- Coordinated in the acquisition of magnetic, multibeam bathymetric and core data.

## Indian School of Mines

*Various Projects*

*Dhanbad, India*

- *M.Sc. project*: Worked on soft computing techniques for intelligent interpretation of petroleum data and characterization of reservoirs.
- Proposed a variant of Ant Colony Optimization suited for large continuous optimization problems.
- Worked on coulomb stress transfer based seismicity modelling of Chamoli-Uttarkashi region.
- Developed *FractalAnalyzer*, a MATLAB based GUI for multifractal seismicity analysis.

## TECHNICAL STRENGTHS

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<b>Computer Languages</b>	C, C++, C#, JAVA, Python, MATLAB
<b>Operating systems</b>	Linux, Windows

## GRANTS/AWARDS/SCHOLARSHIPS

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- 2016 : Best Poster Award at 2016 PME day in Delft, The Netherlands.
- 2014 : Gene Golub SIAM Summer Fellowship to attend a summer school in Linz, Austria.
- 2013-17 : Shell-NWO Computational Sciences for Energy Research Fellowship.
- 2013 : Director's Gold Medal at IIT (ISM) Dhanbad for securing first position in the batch.
- 2012 : SEG Foundation Grant for paper presentation at 2012 SEG Annual Meeting in Las Vegas, USA.
- 2012 : SPG India travel grant for paper presentation at 2012 SPG Biennial Conference in Hyderabad, India.
- 2008-13 : SHE-INSPIRE fellowship awarded by Dept. of Science & Technology, Govt. of India for 5 yr. study at IIT (ISM) Dhanbad.

## COLLABORATIONS

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- 2016-current: Prof. Arthur Weeber and Prof. Rene Swaiij (Photovoltaic Materials and Devices, TU Delft); Optimization of front metallizations in c-Si solar cells.
- 2015-16: Dr. Yulia Galagan (Solliance/Holst Centre, Eindhoven); Optimizing electrode patterns for free-form shapes and experimental validation.
- 2013-current: Dr. Marco Barink (TNO/Holst Centre, Eindhoven); Topology Optimization of metallization patterns for solar cells.

## REVIEWER

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- Publons profile : <https://publons.com/author/1174283>
- Journals : Geophysics (SEG), IJNME (Wiley), JGE (IOP)
- Conferences : EAGE

## PUBLICATIONS

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### Journals

*Total count: 8, published: 8, submitted: 0*

- Gupta D.K., Langelaar, M. and van Keulen F., QR-patterns: Numerical artefacts in multiresolution topology optimization, *Structural and Multidisciplinary Optimization* (submitted).
- Gupta D.K., van der Veen, G.J., Aragon, M.A., Langelaar M. and van Keulen F., 2017, Bounds for decoupled design and analysis discretizations in topology optimization, *International Journal for Numerical Methods in Engineering*, 1-12 (published online).
- Gupta D.K., Barink, M., Galagan, Y. and Langelaar, M., 2017, Integrated front-rear grid optimization of free-form solar cells, *IEEE Journal of Photovoltaics*, 7 (1), 294-302.

- Gupta D.K., Langelaar M., Barink M. and van Keulen F., 2015, Optimizing front metallization patterns: Efficiency with aesthetics in free-form solar cells, *Renewable Energy*, 86, 1332-1339.
- Gupta D.K., Langelaar M., Barink M. and van Keulen F., 2015, Topology optimization of front metallization patterns for solar cells, *Structural and Multidisciplinary Optimization*, 51 (4), 941-955.
- Roy P.N.S. and Gupta D.K., 2015, FractalAnalyzer: A MATLAB Application for Multifractal Seismicity Analysis, *Seismological Research Letters*, 86 (5), 1424-1431.
- Gupta D.K., Bhowmick D. and Roy P.N.S., 2015, Himalayan hazard study on the basis of stress and strain state of 1991 Uttarkashi earthquake using coulomb stress transfer model, *Geomatics, Natural Hazards and Risk*, 6 (2), 131-148.
- Shankar U., Gupta D.K., Bhowmick D. and Sain K., 2013, Gas hydrate and free gas saturations using rock physics modelling at site NGHP-01-05 and 07 in the Krishna-Godavari Basin, eastern Indian margin, *Journal of Petroleum Science and Engineering*, 106, 62-70.
- Gupta D.K., Gupta, J.P., Arora, Y. and Shankar U., 2013, Recursive ant colony optimization: a new technique for the estimation of function parameters from geophysical field data, *Near Surface Geophysics*, 11 (3), 325-339.

## Conference Proceedings

Total count: 8

- Gupta D.K., Langelaar M., and van Keulen F., 2016, Combined mesh and penalization adaptivity based topology optimization 57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 09453, 1-12.
- Gupta D.K., Langelaar M., van Keulen F. and Barink M., 2014, Topology Optimization: An effective method for designing front metallization patterns of solar cells 4th International Conference on Engineering Optimization, CRC Press, 323-328.
- Bhowmick, D., Gupta D.K., Malhotra, M. and Shankar, U., 2014, A New Tool for Estimation of Gas Hydrate Saturation, 76th EAGE Conference and Exhibition, 1-4.
- Gupta D.K., Langelaar M., Barink M. and van Keulen F., 2014, Topology Optimization: An effective method for designing front metallization patterns of solar cells 2014 IEEE 40th Photovoltaic Specialist Conference (PVSC), 2471-2475.
- Gupta D.K., Bhowmick, D., Shankar, U. and Sain, K., 2012, Transformation From Acoustic to Reservoir Properties Based on Ant Colony Model and Effective Medium Theory 2012 SEG Annual Meeting, 1-4.
- Bhowmick, D., Gupta D.K. and Shankar, U., 2012, Estimation of Gas Hydrate Saturation Using Rock Physics Modelling-A Case Study in the Krishna-Godavari Region, 5th EAGE St. Petersburg International Conference and Exhibition, 1-4.
- Arora, Y., Gupta D.K., Gupta, J.P. and Singh, U.K., 2012, Inversion of 1D VES Data Using New a Technique Called Recursive Ant Colony Optimization (RACO), 5th EAGE St. Petersburg International Conference and Exhibition, 1-4.
- Gupta D.K., Arora, Y., Singh, U.K. and Gupta, J.P., 2012, Recursive Ant Colony Optimization for estimation of parameters of a function, IEEE 2012 1st International Conference on Recent Advances in Information Technology (RAIT), 448-454.

## SUPERVISION TASKS

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### M.Sc. Students

- current: Marco Swiestra (TU Delft); Optimal post-processing of topology optimized designs (daily supervisor).
- current: Joachim K. van Schoubroeck (TU Delft); On choosing initial designs for better performance in topology optimization (daily supervisor).
- 2015-16: Michiel E. Dondorp (TU Delft); GPU Computing for Topology Optimization (co-supervisor).

### Interns

- 2014: Bas Smits (TU Delft); Optimal design of a solar cell front electrode (co-supervisor).

## **ADDITIONAL INFORMATION**

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### **Other achievements**

- President of EAGE Student Chapter of Indian School of Mines for the term 2012-13.
- Represented India as a team in the finals of the 2009 Global Entrepreneurs Program conducted by Stanford Entrepreneurs Society of Stanford University.

### **Languages**

- English (professional proficiency)
- Hindi (native language)
- Bengali (intermediate)

### **Hobbies**

- cricket, football, running and swimming
- sketching, flying kites and computer gaming

## **REFERENCES**

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Available on request.