

# CURRICULUM VITAE

**Dr. PRASHANTH REDDY MARPU**

*Remote sensing image analyst*

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## Objective:

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To be a part of a quality work environment.

## Education:

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- 04/2009:** Freiberg University of Mining and Technology, Freiberg, Germany.  
Received a Doctor of Philosophy Degree with “magna cum laude”.
- 03/2006:** Technical University of Denmark, Kongens Lyngby, Denmark.  
Received a Master of Science Degree in Wireless Engineering
- 06/2003:** Jawaharlal Nehru Technological University, Hyderabad, India.  
Received a Bachelor of Technology Degree in Electronics and Communications Engineering with distinction.

## Experience:

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- 05/2009-present:** Experienced Researcher position in EU funded Hyper-I-Net project as a Marie Curie Fellow with the Remote sensing group at the University of Pavia working on hyperspectral image processing.
- 01/2007-04/2009:** Researcher in LIMES (Land Sea Integrated Monitoring for European Security) project, working on “*Object-based image analysis for wide area monitoring*” working with the Geomonitoring working group at TU Freiberg. The work includes providing software for change detection and visualization of changes, software to identify industrial sites in medium resolution images and demonstrate the strength of object based image analysis for classification of treaty monitoring relative features.
- 03/2006-02/2008:** Researcher in GMOSS (Global Monitoring for Security and Stability) network, working on “*Object-based approach for change detection using remote sensing data*” working with Geomonitoring working group at TU Freiberg.
- 02/2006-11/2006:** Image analyst at Institute for Geology, TU Freiberg working on “*Automatic Counting of Fission tracks in Microscopic images.*”
- 01/2006-12/2006:** Research Assistant at Institute for Geology, TU Freiberg working on “*Structural analysis of rifts using remote sensing data.*”
- 06/2000-08/2002:** Part-time instructor of C,C++ and Java programming languages at ICSS Informatics Ltd, Shadnagar, A.P., India

## **Fields of interest:**

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Object-based image analysis, remote sensing, hyperspectral data processing, fractal mathematics, image processing, mathematical morphology, geosciences, electromagnetism.

## **Computer Skills:**

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**Languages:** C, C+ and Java

**Platforms:** Linux and Windows

**Scripting:** Matlab, IDL, Scilab

**Softwares:** Definiens Developer, PCI Geomatica, ITT ENVI, Several image processing, remote sensing and GIS related software.

## **Software Development:**

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- i) Automatic counting of Fission tracks from labeled regions using MATLAB.
- ii) Hu's invariant moments (corrected after Siao and Pawlak) using IDL/ENVI.
- iii) Feed forward neural networks (Back propagation, Scaled conjugate gradients, Kalman filter and Adaboost) using IDL/ENVI.
- iv) Geostatistics based texture features using MATLAB and C++.
- v) **SeATh** (Seaparability and Thresholds) tool for automatic feature detection in object-based classification and hyperspectral data processing using IDL/ENVI.
- vi) **ChangeView**, software for automatic change detection and visualisation of changes for multispectral data using IDL.
- vii) Class dependent neural networks using IDL/ENVI.
- viii) Graph based multi-level image segmentation using IDL/ENVI (C++ code under development)

## **Publications:**

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### ***Book chapters and Journals:***

- i) Gloaguen R., Marpu P.R., Niemeyer I., 2007, Automatic Extraction of Faults and Fractal Analysis from Remote Sensing Data, *Nonlin. Processes Geophys.*, 14, 131–138, 2007.
- ii) Marpu, P.R., Nussbaum S., Niemeyer I. & R. Gloaguen (2008): A Procedure for automatic object-based classification. In: Blaschke, T., Lang, S. & G. Hay (ed.) (2008): *Object-Based Image Analysis Spatial Concepts for Knowledge-Driven Remote Sensing Applications*. Series: Lecture Notes in Geoinformation and Cartography. Springer, Berlin
- iii) Niemeyer, I., Marpu, P.R. & S. Nussbaum (2008): Change detection using object features. In: Blaschke, T., Lang, S. & G. Hay (ed.) (2008): *Object-Based Image Analysis Spatial Concepts for Knowledge-Driven Remote Sensing Applications*. Series: Lecture Notes in Geoinformation and Cartography. Springer, Berlin
- iv) A. Wijaya, P. R. Marpu, and R. Gloaguen. Geostatistics texture classification of tropical rainforests in Indonesia. In S. Stein and Bijker (3d.) (2008) : *Quality in spatial data mining*. CRC Book Series.

### ***Submitted:***

- i) P.R. Marpu and I. Niemeyer. Shape segmentation using skeleton and border directions.

*(Journal of spatial science)*

- ii) P.R. Marpu, M. Neubert, H. Herold and I. Niemeyer. Enhanced evaluation of image segmentation results and parameter optimization of multi-level algorithms. *(Journal of spatial science)*
- iii) P.R. Marpu, J. Katrenic and I. Niemeyer. Graph based multi-level Image segmentation. *(IJGIS)*
- iv) P.R. Marpu, F.Bachmann and I.Niemeyer. A neural network architecture for object based classification. *(IJGIS)*
- v) C. Daneke, P.R. Marpu and I. Niemeyer. A monitoring system framework using object-based image analysis in the context of treaty monitoring applications. *(IJGIS)*
- vi) A. Wijaya, P.R. Marpu, and R. Gloaguen. The study of geostatistics texture features for complex land cover mapping. *(Journal of Applied Remote Sensing)*

***Under Preparation:***

- i) P.R. Marpu, P. Gamba and I. Niemeyer. Hyperspectral data classification using an ensemble of class-dependent neural networks.
- ii) P.R. Marpu. Automatic change detection using ensemble of neural networks.
- iii) P.R. Marpu and I. Niemeyer. ChangeView – A software tool for automatic change detection and visualization of changes.
- iv) K. Bakos, P. R. Marpu and P. Gamba. Decision fusion of multiple classifiers for hyperspectral data classification.
- v) A. Wijaya, P.R. Marpu, and R. Gloaguen. Evaluation of dual-polarimetric terrasar-x data for the assessment of soil thickness in tropical peatland forest of central indonesia.

***Conference presentations/proceedings:***

- i) Marpu P., Gloaguen R., 2006, Structural Analysis of the Active Rifts using Remote Sensing. Implications for Oil Trappings. BHT, Kolloquium II, Freiberg, Germany, June, 2006.
- ii) Marpu P.R., Gloaguen R., Niemeyer I., 2006, Evaluation of the Efficiency of Object-based Classification in the Identification of Geological Structures. Case Study: Normal Faults. IGARSS 2006, Denver, Colorado, USA.
- iii) Marpu P.R., Niemeyer I., Gloaguen R., 2006, A Procedure for Automatic Object-based Classification, 1st International Conference on Object-based Image Analysis (OBIA 2006), July 4-5 2006 Salzburg, Austria.
- iv) Marpu P.R., Lippold J., Gloaguen R., Jonckere R., 2006, Automatic Identification of Fission-tracks using Object-Based Image Analysis. European Conference on Thermochronology. Bremen, Germany, August, 2006.
- v) Marpu P.R., Lippold, J., Gloaguen R., Niemeyer I., Jonckere R., 2006, Object-based Classification Algorithm for Automatic Identification of Fission-tracks. IAMG Conference, Quantitative Geology from Multiple Sources. Liege, Belgium, September 3-8, 2006.

- vi) Marpu P.R., Gloaguen R., Niemeyer I., 2006, Fractal Dimension as a Basis for Classifying Geological Structures Using Remote Sensing Data. IAMG Conference, Quantitative Geology from Multiple Sources. Liege, Belgium, September 3-8, 2006.
- vii) Marpu P.R., Nussbaum S., Niemeyer I., 2006, Towards Automation in Object-based classification. ESA-EUSC 2006, Madrid, Spain, November 26-27, 2006.
- viii) Marpu, P.R. and Canty. M : How sensitive are Hu's invariant moments in a small neighbourhood. WP20400, GMOSS NoE meeting, Brussels, 1<sup>st</sup> Mar, 2007.
- ix) Marpu, P.R., Yan, G., Niemeyer, I : Semi-automatic mapping of the coal fire prone areas in china. 58<sup>th</sup> BHT, Freiberg, 15-16, Jun 2007.
- x) Marpu, P.R., Niemeyer, I. and Gloaguen. R., 2007, Unsupervised image segmentation by identifying natural clusters. Proc. of the IEEE International Geoscience and Remote Sensing Symposium, IGARSS'07, Barcelona, 23-27 July 2007.
- xi) Marpu P.R., Canty M., Niemeyer I., 2007, Rational Neural networks, GMOSS NoE Final event, Brussels, 11-12 Dec, 2007.
- xii) P.R. Marpu, A. Wijaya, and R. Gloaguen, 2008, Soft classification and assessment of kalman filter neural network for complex landcover of tropical forests. Proc. of the IEEE International Geoscience and Remote Sensing Symposium, IGARSS'08, Boston, 7-11 July 2008.
- xiii) P.R. Marpu, J. Katrenic and I. Niemeyer, 2008, Image segmentation using a graph theoretic approach. GEOBIA 2008, Calgary, 6-7 August 2008.
- xiv) P.R. Marpu, F. Bachmann and I. Niemeyer, 2008, A class dependent neural network architecture for object-based classification. GEOBIA 2008, Calgary, 6-7 August 2008.
- xv) P.R. Marpu, C. Daneke and I. Niemeyer, 2008, A monitoring system for treaty monitoring applications using object based image analysis. GEOBIA 2008, Calgary, 6-7 Aug 2008.
- xvi) Marpu, P.R., Gamba, P., Niemeyer, I. (2009): Hyperspectral Data Classification Using an Ensemble of Class-Dependent Neural Networks. In: Proc. IEEE 1st Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS), Grenoble, France, August 26-28, 2009 (CD-Rom)

***Contribution to other presentations/proceedings:***

- i) Gloaguen, R.; Marpu, P., Niemeyer, I., Automatic extraction of faults using object oriented classifications and fractal analysis, EGU Conference, Vienna, April 2006.
- ii) Gloaguen, R.; Niemeyer, I., Marpu, P., 2006, Fault Patterns as indicators for increasing Strain: a remote sensing approach, EGU Conference, Vienna, April 2006.
- iii) Niemeyer, I. and P.R. Marpu (2007). Thermal Infrared Satellite Imagery Analysis for Nuclear Safeguards Applications. Proc. 29th Symposium on Safeguards and Nuclear Material Management, Aix-en-Provence, 22-24 May 2007.
- iv) Bruckert, D., Carrié, P., Gonçalves, J.G.M., Loreaux, P., Marpu, P.R., Niemeyer, I., Patrono, A., Sequeira, V., Ussorio, A. & E. Wolfart (2007): LIMES: Treaty Monitoring within the Security Dimension of GMES. In: Proc. 29th Symposium on Safeguards and Nuclear Material Management, Aix-en-Provence, 22-24 May 2007.
- v) Niemeyer, I., Listner, C. & P.R. Marpu (2007) : Change detection based on the object features. In: Publikationen der Deutschen Gesellschaft für Photogrammetrie,

- Fernerkundung und Geoinformation (DGPF) e.V., Band 16, 141-148.
- vi) Gao, Y., Mas, J.F., Niemeyer, I., Marpu, P.R. & J.L. Palacio (2007): Object based image analysis for forest area land cover mapping. In: Proc. International Symposium for Spatial Data Quality (ISSDQ), Enschede, Netherlands, 13-15 June, 2007 (CD-Rom)
  - vii) Wijaya A., Marpu P.R., Gloaguen R., 2007, Geostatistics Texture Classification of Tropical Rainforests in Indonesia, Proceedings of the 5th ISPRS International Symposium on Spatial Data Quality (ISSDQ), Enschede, Netherlands, 13-15 June, 2007.
  - viii) Lippold J., Marpu P.R., Gloaguen R., Jonckheere R., 2007, Automatic Counting of Fission Tracks using Object-Based Image Analysis for Dating Applications., Proceedings of IGARSS 2007, Barcelona.
  - ix) Lippold J., Marpu P.R., Gloaguen R., Jonckheere R., 2007, Object-Based Image Analysis for Fission-Track Dating., Proceedings of Gemeinsame Jahrestagung Der SGPBF, DGPF und OVG, Pub. DGPF. v. 16., p..269-276, ISSN 0942-2870.
  - x) Nussbaum, S., Canty M.J. and P.R. Marpu, 2007, Image Analysis based on object features and invariant moments exemplified for nuclear verification. Proc. 29th Symposium on Safeguards and Nuclear Material Management, Aix-en-Provence, 22-24 May 2007.
  - xi) Niemeyer, I., Marpu, P.R. and S. Nussbaum, 2007, From Landsat-1 to Google Earth and beyond: Perspectives of satellite imagery analysis for Treaty verification. Proc. of the 48th INMM Annual Meeting, Tucson, Arizona, 8-12 July 2007.
  - xii) Niemeyer, I., Marpu, P.R. and S. Nussbaum, 2007, Change Detection Using the Object Features. Proc. of the IEEE International Geoscience and Remote Sensing Symposium, IGARSS'07, Barcelona, 23-27 July 2007.
  - xiii) Christian Daneke, Prashanth Reddy Marpu and Irmgard Niemeyer, Automated analysis of remote sensing data for comprehensive monitoring tasks in the context of nuclear safeguards. March 3-4, DPGVe 2008.
  - xiv) Jan Katrenic, Prashanth Reddy Marpu and Irmgard Niemeyer, Image segmentation using a graph theoretic approach. MATGEOS, First workshop on Mathematical Geosciences, June 11-12, 2008.
  - xv) Florian Bachmann, Prashanth Reddy Marpu and Irmgard Niemeyer, 2008, Class-dependent neural network architecture for object-based image analysis. MATGEOS, First workshop on Mathematical Geosciences, June 11-12, 2008.
  - xvi) Irmgard Niemeyer and Prashanth Reddy Marpu, 2008, Treaty monitoring using satellite imagery: Challenges and prospects. ISPRS XXIst Congress, Beijing. July 3-11, 2008.
  - xvii) I. Niemeyer, P. R. Marpu and C. Daneke, Automated Information Extraction and Information Management using Satellite Imagery Analysis and Geodatabase Systems. Proc. Of 49<sup>th</sup> INMM Annual Meeting, Tokyo, Japan, 6-9 Oct, 2008.
  - xviii) Niemeyer, I., Bachmann, F., Bratskikh, A., John, A., Kristinsdóttir, B., Listner, C. & P.R. Marpu (2009): Techniques for object-based image analysis. In: Publikationen der Deutschen Gesellschaft für Photogrammetrie, Fernerkundung und Geoinformation (DGPF) e.V., Band 18, 139-146
  - xix) Gonçalves, J.G.M., Marpu, P.R., Niemeyer, I., Patrono, A., Ussorio, A. & E. Wolfart. LIMES: Satellite Imagery Analysis and Information Management for Treaty Monitoring. In: Proc. 30th Symposium on Safeguards and Nuclear Material Management, Aix-en-Provence, 26–28 May 2009.
  - xx) A. Wijaya, P. Marpu, and R. Gloaguen. Evaluation of dual-polarimetric terrasar-x data for the assessment of soil thickness in tropical peatland forest of central indonesia. In

- SPIE Europe - Remote Sensing Conference*, Berlin, August, 2009.
- xxi) Irmgard Niemeyer, Florian Bachmann, Andre John, Clemens Listner, Prashanth R. Marpu, Object-based change detection and classification, In *SPIE Europe - Remote Sensing Conference*, Berlin, August, 2009.
  - xxii) Irmgard Niemeyer, Clemens Listner and Prashanth R. Marpu, Treaty monitoring from space: satellite imagery analysis for verifying treaty compliance. In *SPIE Europe - Remote Sensing Conference*, Berlin, August, 2009.
  - xxiii) Niemeyer, I., Bachmann, F., Bratskikh, A., John, A., Kristinsdóttir, B., Listner, C. & P.R. Marpu (2009): Techniques for object-based image analysis. In: Publikationen der Deutschen Gesellschaft für Photogrammetrie, Fernerkundung und Geoinformation (DGPF) e.V., Band 18, 139-146

### **Summer Schools and Short Courses:**

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- i) GMOSS Summer School on “Human Security: People - Homes – Infrastructure” at the Paris-Lodron-University in Salzburg, Austria. October 01-08, 2006
- ii) ESARDA short course on “Nuclear safeguards and non-proliferation” at EC JRC, Italy. March 05-09, 2007
- iii) IAMG short course on “Statistical analysis of compositional data” at TU Freiberg. June 12-14, 2007
- iv) Inter-cultural Training at TU Freiberg. January 18, 2008
- v) Inter-cultural workshop at T-Systems MMS GMBH, Dresden. January 25, 2008
- vi) Project management at TU Freiberg. June 13, 2008

### **Master/Bachelor thesis supervision:**

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- i) **Judith Lippold**, *Evaluation of the automatic counting method for fission track dating using OOC*, MSc, TU Freiberg, Germany, 2007.
- ii) **Christian Daneke**, *Automated analysis of remote sensing data for comprehensive monitoring tasks in the context of nuclear safeguards*. MSc, Uni. Vienna, Austria, 2008.
- iii) **Bjarnheidur kristinsdottir**, *Implications of invariant moments in image analysis*, MSc, TU Freiberg, Germany, 2008.
- iv) **Florian Bachmann**, *A neural network architecture for object-based image analysis*, MSc, TU Freiberg, Germany, 2009.

### **Teaching:**

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- i) International Remote sensing short course, TU Freiberg. Mar 2006.
- ii) Remote sensing II /Digital image processing. Summer Semester 2008, TU Freiberg.
- iii) IAMG Student chapter Freiberg short courses on Matlab/IDL programming and Digital image processing.
- iv) International Remote sensing short course, TU Freiberg. Mar-April 2008.
- v) International Remote sensing short course, TU Freiberg. Mar 2009.

**Other:**

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- i) Reviewer for International Journal of Remote Sensing (2007,2008,2009), Mathematical Geosciences (2007, 2008,2009) and IGARSS (2008,2009)
- ii) President and founder member of the IAMG Student Chapter at TU Freiberg (2006- 08)
- iii) Treasurer of Investment club at TU Freiberg. (2008)
- iv) Chair of Organization of MATGEOS 2008, First workshop on Mathematical Geosciences. June 11-12, 2008
- v) Organization of Geodays 2008 at TU Freiberg
- vi) Organization of the third Hyper-I-Net Summer School on Hyperspectral imaging. Sep 8-11, 2009

**Personal details:**

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***Date of Birth:*** 12<sup>th</sup> March, 1982

***Nationality:*** Indian

***Languages:*** I can speak fluently and write English, Hindi and Telugu.

***Memberships:*** IEEE GRSS, IAMG

I certify that the provided information is right to the best of my knowledge and I am responsible for all the information.

Sincerely,

Prashanth Reddy Marpu