

**Divyanshu Vats**  
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### **Objective**

To obtain a summer internship working in areas related to applied mathematics.

### **Education**

*Carnegie Mellon University, Pittsburgh, PA.*

PhD Candidate, Electrical Engineering, Sept 2006 – Present

Advisor: Prof. José M. F. Moura

*The University of Texas at Austin, Austin, TX.*

Bachelor of Science, Electrical Engineering, May 2006

Bachelor of Science, Mathematics, May 2006

Thesis: “Designing and Implementing a Matlab Toolbox for Image-Based Rendering”

### **Course Work**

*CMU:* Estimation-Detection-and-Identification, Information Theory, Advanced DSP, Wireless Communications, Regression Analysis, Advanced Probability, Functional Analysis.

*UT Austin:* Digital Signal Processing (DSP), Probability and Stochastic Processes, Digital Communications, Neural Networks, Wireless Networks, Computer Graphics, Real Analysis, Complex Analysis, Linear Algebra, Algebraic Structures, Wavelets, Error-Correcting Codes, Numerical Analysis.

### **Research Work**

*Current:* Signal Representation via Random Fields.

*Past:* Image Authentication, Image-based Rendering, Compression via Wavelets.

### **Work Experience**

*Google Summer of Code 2006 Participant, Google Inc., 05/06 – 08/06*

One of 630 student participants selected out of over 3000 applicants to the program. Worked with GIMP to provide support for Jpeg2000 images, image denoising, and inverse halftoning.

*Grader, Dept. of Electrical and Computer Engineering, UT Austin, Austin, TX, 09/05 – 12/05*

Wrote solutions and graded homework problems for Probability and Random Processes class

*Summer Research Intern, Rice University, Houston, TX, 05/05 – 08/05*

Successfully implemented an image based rendering system for reconstructing new views of a scene from virtual camera positions.

*Summer Research Intern, MIT Haystack Laboratory, Westford, MA, 06/04 – 08/04*

Designed and tested a new digital receiver for a Small Radio Telescope (SRT).

*Undergraduate Assistant, Homework Services, UT Austin, Austin, TX, 05/03 – 05/05*

Wrote homework problems for Math, Physics, and Chemistry in TeX and C.

### **Academic Projects**

*White Noise driven Representations of Random Fields (Current):* Developing a framework for representing random fields with continuous indices.

*Matlab Toolbox for Image-Based Rendering* (Fall 2005, Spring 2006): Built a toolbox for doing image-based rendering where images captured from a camera array were processed to give a complete 3D model of a scene. This helped in reconstructing new views of the scene from virtual camera positions. Also, successfully showed how to achieve compression of the 3D model generated to efficiently store the data.

*Error-Correcting Codes on Cellular Phones* (Spring 2005): Studied different types of channel coding schemes used in GSM and CDMA based cell phone standards. Through Matlab simulations, showed the importance of coding followed by interleaving speech signals in a GSM network.

*Image Authentication under Geometric Attacks* (Fall 2004): Proposed and implemented a technique for image authentication under geometric attacks such as scaling, rotation, shearing, and translation under the supervision of Prof. Brian Evans at UT Austin.

*An approach for converting 2-layer networks to 3-layer networks* (Fall 2004): Proposed and implemented an algorithm (as part of a group) for converting 2-layer networks to 3-layer network using Multidimensional Taylor Expansion.

*Cricket Analysis using Affine Transformation* (Spring 2004): Implemented a program in Matlab to tell which side a ball is hit in a cricket match (a game mostly played in Europe and Asia). The program took a video sequence as input and put an indicator on the screen of the position of the ball.

### **Publications/ Presentations**

1. Divyanshu Vats, Poster and Presentation on “Image-Based Rendering Via Lumigraphs”, *Undergraduate Research Forum*, April 8 2006, Austin, TX.
2. Divyanshu Vats, Charlie Ice, Richard Baraniuk, Presentation on “Accurate Light Fields from a Simple System,” *Texas Instruments Developer Conference*, March 1, 2006, Dallas, TX.
3. V. Monga, D. Vats, and B. L. Evans, "Image Authentication Under Geometric Attacks Via Structure Matching", *Proc. IEEE Int. Conf. on Multimedia & Expo*, Jul. 6-8, 2005, Amsterdam, The Netherlands.
4. D. Vats and A. Rogers, Poster on “Development and Testing of a New Small Radio Telescope (SRT) Receiver” at the *205<sup>th</sup> meeting of the American Astronomical Society (AAS)*, January 9-13, 2005, San Diego, CA.

### **Accomplishments**

Recipient, Carnegie Institute of Technology Fellowship for Graduate Studies, Sept 06 - Present

Recipient, George Mitchell Award for Academic Excellence at UT Austin, 2006

Best Presentation Award at the Undergraduate Research Forum, UT Austin, April 2006

Recipient, Texas Telecommunications Engineering Consortium Scholarship, 2004-2005

Recipient, Undergraduate Research Fellowship Award, 2004-2005

Recipient, Unrestricted Endowed Presidential Scholarship, 2004-2005

1<sup>st</sup> place in “Albert A. Bennett Calculus Prize Exam”, 2002

Ranked among top 3% of about 150,000 students appearing for IIT-JEE, 2002