Gaurav Bhatnagar

Assistant Professor, Mathematics and Statistics, Indian Institute of Technology Jodhpur, Rajasthan, India.
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5003 Porta-Cabin (behind Admin Block),
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Professional Experience

2013–till date	**Assistant Professor** • *Institute*: Indian Institute of Technology Jodhpur, Rajasthan, India. • *Department*: Department of Mathematics and Statistics.
2009–2013	**Postdoctoral Research Associate** • *Institute*: Department of Electrical and Computer Engineering, University of Windsor, ON, Canada. • *Advisor*: Prof. Jonathan Wu • *Duties*: Responsible for carrying out innovative and insightful research in the area of wavelet analysis and fractional transform theory with their application in numerous computer science areas. • *Url*: www.uwindsor.ca/engineering/cvss/~gauravb
2006–2009	**Teaching Assistant** • *Institute*: Department of Mathematics, Indian Institute of Technology Roorkee, India. • *Duties*: Responsible for conducting tutorials and labs for graduate and under-graduate students for Calculus, Co-ordinate Geometry, Numerical Analysis, Image Processing, Data Base Management Systems and Computer Applications.
2006–2009	**CSIR Research Fellow** Department of Mathematics, Indian Institute of Technology Roorkee, India.

Education

2006–2010	**PhD (Applied Mathematics and Computer Science)** • *Institute*: Department of Mathematics, Indian Institute of Technology Roorkee, India. • *Thesis Title*: Emphasized Digital Watermarking on Singular Value Decomposition in Frequency Domain. • *Advisor*: Dr. R. Balasubramanian
2003–2005	**MSc (Applied Mathematics)** • *Institute*: Department of Mathematics, Indian Institute of Technology Roorkee, India. • *Project Title*: Similarity Solutions of Partial Differential Equations. • *Dissertation Title*: Direct Methods of Calculus of Variations for Solving Partial Differential Equations. • *Advisor*: Prof. Y.K. Gupta

- *Marks*: CGPA 7.95/10.0 (equivalent to 79.5%)

2001–2003	**BSc (Basic Science)**
	• *Institute*: Chaudhary Charan Singh University Meerut, India.
	• *Marks*: 72%

Research Interest

| Applied Mathematics | Wavelet Analysis |
| | Fractional Transform Theory |

Computer Science and Engineering	Image and Video processing
	Multimedia Security: Digital Watermarking
	Multimedia Security: Encryption Techniques
	Biometrics
	Information Fusion
	Image Quality Assessment

Publications

I have published a total of 2 book chapters, 25 journal papers and a total of 15 refereed conference papers. In addition, 4 journals papers are accepted and 1 journal paper is in revision. I have an erdos number 6 and my total citation counts is over 242 for all the publications published since 2008. The details of my publications are as follows.

Book Chapters (Under Review: 00, Accepted: 00, Published: 02)

| 2012 | [B2] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Distributed Multiresolution Transform Based Framework for Watermarking," in *Information Technology for Intellectual Property Protection: Interdisciplinary Advancements*, H. Sasaki (Ed.), IGI Global, pp. 1-29, 2012. |
| 2009 | [B1] G. Bhatnagar and B. Raman, "Robust Encryption based Watermarking in Fractional Wavelet Domain," in *Recent Advances in Multimedia Signal Processing and Communications*, vol. 231, M. Grgic, K. Delac, M. Ghanbari (Ed.), Springer Verlag, pp. 375-416, 2009. |

Journals (Under Review: 02, In Revision: 01, Accepted: 04, Published: 25)

Submitted	[J37] Z. Liu, W. Wu and **G. Bhatnagar**, "Image Quality Assessment: a Segmentation Perspective," *IEEE Signal Processing Letters*, September 2013.
	[J36] **G. Bhatnagar**, Q.M.J. Wu and Z. Liu, "A New Contrast based Multimodal Medical Image Fusion Framework," *Signal Processing*, May 2013.
In Revision	[J35] **G. Bhatnagar** and Q.M.J. Wu, "A novel chaos-based secure transmission of biometric data," *Neurocomputing*, October 2013.
	[J34] **G. Bhatnagar** and Q.M.J. Wu, "Biometric inspired multimedia Encryption based on Dual Parameter Fractional Fourier Transform," ***IEEE Transactions on System Man and Cybernetics-Part A, Systems and Humans***, April 2013.
Accepted (In Press)	[J33] **G. Bhatnagar**, A. Saha, Q.M.J. Wu and P.K. Atrey, "Analysis and Extension of Multiresolution form of Singular Value Decomposition," *Information Sciences*, 2013.
	[J32] **G. Bhatnagar** and Q.M.J. Wu, "A new robust and efficient multiple watermarking scheme," *Multimedia Tools and Applications*, 2013.

[J31] **G. Bhatnagar**, Q.M.J. Wu and P.K. Atrey, "Secure Randomized Image Watermarking based on Singular Value Decomposition," ***ACM Transactions on Multimedia Computing, Communications, and Applications***, 2013.

[J30] **G. Bhatnagar** and Q.M.J. Wu, "Enhancing the Transmission Security of Biometric Data using Chaotic Encryption," *Multimedia Systems*, 2013.

2013

[J29] G. Bhatnagar, Q.M.J. Wu and Z. Liu, "Directive Contrast based Multimodal Medical Image Fusion in NSCT domain," ***IEEE Transactions on Multimedia***, vol. 15, no. 5, 2013, pp. 1014-1024.

[J28] G. Bhatnagar and Q.M.J. Wu, "A new logo Watermarking based on Redundant Fractional Wavelet Transform," *Mathematical and Computer Modelling*, vol. 58, no. 1-2, 2013, pp. 204-218.

[J27] N. Taneja, G. Bhatnagar, B. Raman and I. Gupta, "Joint Watermarking and Encryption for Still Visual Data," *Multimedia Tools and Applications*, vol. 67, no. 3, 2013, pp. 593-606.

[J26] G. Bhatnagar, Q.M.J. Wu and B. Raman, "A new Aspect in Robust Digital Watermarking," *Multimedia Tools and Applications*, vol. 66, no. 2, 2013, pp. 179-200.

[J25] A. Saha, G. Bhatnagar and Q.M.J. Wu, "Mutual Spectral Residual Approach for Multifocus Image Fusion," *Digital Signal Processing*, vol. 23, no. 4, 2013, pp. 1121-1135.

[J24] G. Bhatnagar, Q.M.J. Wu and Z. Liu, "Human Visual System Inspired Multi-modal Medical Image Fusion Framework," *Expert Systems With Applications*, vol. 40, no. 5, 2013, pp. 1708-1720.

[J23] G. Bhatnagar and Q.M.J. Wu, "Biometrics Inspired Watermarking based on Fractional Dual Tree Complex Wavelet Transform," *Future Generation Computer Systems*, vol. 29, no. 1, 2013, pp. 182-195.

[J22] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Discrete Fractional Wavelet Transform and its Application to Multiple Encryption," *Information Sciences*, vol. 223, 2013, pp. 297-316.

2012

[J21] G. Bhatnagar, Q.M.J. Wu and B. Raman, "A new Fractional Random Wavelet Transform for Fingerprint Security," ***IEEE Transactions on System Man and Cybernetics-Part A, Systems and Humans***, vol. 42, no. 1, pp. 262-275, 2012.

[J20] G. Bhatnagar and Q.M.J. Wu, "Security Solution for Fingerprint Data During Communication and Transmission," ***IEEE Transactions on Instrumentation and Measurement***, vol. 61, no. 4, pp. 876-887, 2012.

[J19] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Fractional Dual Tree Complex Wavelet Transform and its Application to Biometric Security during Communication and Transmission," *Future Generation Computer Systems*, vol. 28, no. 1, pp. 254-267, 2012.

[J18] G. Bhatnagar, B. Raman and Q.M.J. Wu, "Robust Watermarking using Fractional Wavelet Packet Domain," *IET Image Processing*, vol. 6, no. 4, pp. 386-397, 2012.

[J17] G. Bhatnagar and Q.M.J. Wu, "Selective Image Encryption based on Pixels of Interest and Singular Value Decomposition," *Digital Signal Processing*, vol. 22, no. 4, pp. 648-663, 2012.

[J16] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Image and Video Encryption based on Dual Space Filling Curves," *The Computer Journal*, vol. 55, no. 6, pp. 667-685, 2012.

[J15] G. Bhatnagar, Q.M.J. Wu and B. Raman, "A new Robust Adjustable Logo Watermarking Scheme," *Computer & Security*, vol. 31, no. 1, pp. 40-58, 2012.

[J14] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Robust Gray-scale Logo Watermarking in Wavelet Domain," *Computers & Electrical Engineering*, vol. 38, no. 5, pp. 1164-1176, 2012.

[J13] G. Bhatnagar and Q.M.J. Wu, "An Image Fusion Framework based on Human Visual System in Framelet Domain," *International Journal of Wavelets, Multiresolution and Information Processing*, vol. 10, no. 1, pp. 12500021-30, 2012.

[J12] S. Kumar, G. Bhatnagar, B. Raman and N. Sukavanam, "Security of Stereo Images during Communication and Transmission," *Advanced Science Letters*, vol. 6, pp. 173-179, 2012.

[J11] G. Bhatnagar, "A new Facet in Robust Digital Watermarking Framework," *International Journal of Electronics and Communications*, vol. 66, no. 4, pp. 275-285, 2012.

[J10] G. Bhatnagar and B. Raman, "Wavelet Packet Transform based Robust Video Watermarking Technique," *Sadhana: Academy Proceedings in Engineering Sciences*, vol. 37, no. 3, pp. 371-388, 2012.

[J9] G. Bhatnagar and Q.M.J. Wu, "A Novel Chaotic Encryption Framework for Securing Palmprint Data," *Procedia Computer Science*, vol. 10, pp. 442-449, 2012.

2011 [J8] G. Bhatnagar, Q.M.J. Wu and B. Raman, "A Robust Security Framework for 3D Images," *Journal of Visualization*, vol. 14, no. 1, pp. 85-93, 2011.

[J7] G. Bhatnagar and B. Raman, A new Robust Reference Logo Watermarking Scheme, *Multimedia Tools and Applications*, vol. 52, no. 2, pp. 621-640, 2011.

2010 [J6] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Biometric Template Security based on Watermarking," *Procedia Computer Science*, vol. 2, pp. 227-235, 2010.

[J5] G. Bhatnagar and B. Raman, "Distributed Multiresolution Discrete Fourier Transform and its Application to Watermarking," *International Journal of Wavelets, Multiresolution and Information Processing*, vol. 8, no. 2, pp. 225-241, 2010.

2009 [J4] G. Bhatnagar and B. Raman, "A new Reference Watermarking Scheme based on DWT-SVD," *Computer Standards and Interfaces*, vol. 31, no. 5, pp. 1002-1013, 2009.

[J3] G. Bhatnagar and B. Raman, "Robust reference-watermarking scheme using Wavelet Packet Transform and Bidiagonal-Singular Value Decomposition," *International Journal of Image and Graphics*, vol. 9, no. 3, pp. 449-447, 2009.

[J2] G. Bhatnagar, S. Kumar, B. Raman and N. Sukavanam, "Stereo Image Coding via Digital Watermarking," *Journal of Electronic Imaging*, vol. 18, 033012, 2009.

[J1] G. Bhatnagar, R. Jayaganthan and B. Raman, "Wavelet Analysis of Surface Morphologies of Magnetron Sputtered Al-Cu thin films," *International Journal of Wavelets, Multiresolution and Information Processing*, vol. 7, no. 1, pp. 59-74, 2009.

Conferences (Under Review: 00, Accepted: 00, Published: 15)

2012 [C15] A. Saha, G. Bhatnagar and Q.M.J. Wu, "SVD Filter based Multiscale Approach for Image Quality Assessment," *Proc. IEEE Int. Conf. Multimedia & Expo Workshop*, Melbourne, Australia, July 9-13, 2012, pp. 43-48.

2011 [C14] G. Bhatnagar and Q.M.J. Wu, "Human Visual System based Framework for Concealed Weapon Detection," *Proc. Canadian Conf. Computer and Robot Vision*, St. Johns, Newfoundland, Canada, May 25-27, 2011, pp. 250-256.

[C13] G. Bhatnagar and Q.M.J. Wu, "A New Robust Reference Watermarking Framework in Gyrator Domain," *Proc. IEEE Canadian Conf. Electrical and Computer Engineering*, Niagara Falls, Ontario, Canada, May 8-11, 2011, pp. 648-651.

	[C12] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Navigation and Surveillance using Night Vision and Image Fusion," *Proc. IEEE Sym. Industrial Electronics & Applications*, Langkawi Island, Malaysia, September 25-28, 2011, pp. 342-347.
	[C11] G. Bhatnagar, Q.M.J. Wu and B. Raman, "A Novel Image Encryption Framework based on Markov Map and Singular Value Decomposition," *Proc. Int. Conf. Image Analysis and Recognition*, vol. 2, Burnaby, BC, Canada, June 22-24, 2011, pp. 286-296.
2010	[C10] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Real Time Human Visual System Based Framework for Image Fusion," *Proc. Int. Conf. Image and Signal Processing*, Trois-Rivires, Qubec, Canada, June 30 - July 2, 2010, pp. 71-78.
	[C9] G. Bhatnagar, Q.M.J. Wu and B. Raman, "Performance Evaluation of Multiresolution Methods in Disparity Estimation" *Proc. Int. Conf. Image and Signal Processing*, Trois-Rivires, Qubec, Canada, June 30 - July 2, 2010, pp. 496-504.
	[C8] G. Bhatnagar, Q.M.J. Wu and B. Raman, "SVD-based robust watermarking using fractional cosine transform," *Proc. SPIE Defense, Security, and Sensing: Mobile Multimedia/Image Processing, Security, and Applications*, vol. 7708, Orlando, Florida, United States, April 5-9, 2010, pp. 77080O-77080O-11.
	[C7] G. Bhatnagar and B. Raman, "A New SVD Based Watermarking Framework in Fractional Fourier Domain," *Proc. Int. Conf. Contemporary Computing*, vol. 1, Noida, India, August 9-11, 2010, pp. 107-118.
2009	[C6] G. Bhatnagar, S. Arrabolu, R. Balasubramanian and K. Swaminathan, "Multipurpose Watermarking Scheme using Essentially Non-Oscillatory Point-Value Decomposition," *IS&T/SPIE Int. Sym. Electronic Imaging: Proc. Wavelet Applications in Industrial Processing VI*, vol. 7248, San Jose, California, USA, Jan 18-22, 2009, pp. 7248N1-N10.
	[C5] G. Bhatnagar and B. Raman, "Robust Watermarking using Distributed MR-DCT and SVD," *Proc. Int. Conf. Advances in Pattern Recognition*, Kolkata, India, Feb 4-6, 2009, pp. 21-24.
	[C4] S. Rawat, G. Bhatnagar and B. Raman, "A Robust Watermarking Scheme using Best Tree Wavelet Packet Transform," *Proc. IEEE Int. Advance Computing Conf.*, Patiala, India, March 6-7, 2009, pp. 883-887.
	[C3] G. Bhatnagar and B. Raman, "Robust Watermarking in Multiresolution Walsh-Hadamard Transform, *Proc. IEEE Int. Advance Computing Conf.*, Patiala, India, March 6-7, 2009, pp. 894-899.
2008	[C2] G. Bhatnagar and B. Raman, "A new robust logo-watermarking scheme based on Image Fusion," *Proc. Int. Conf. Cognition and Recognition*, Mysore, India, April 10-12, 2008, pp. 367-375. (Best Paper Award)
	[C1] G. Bhatnagar and B. Raman, "Robust Watermarking Scheme based on Multiresolution Fractional Fourier Transform," *Proc. Indian Conf. on Computer Vision, Graphics and Image Processing*, Bhubaneswar, India, Dec 16-19, 2008, pp. 1-8.

Awards, Achievements and Memberships

Awards	• **Best paper award** for a research paper in "International Conference of Cognition and Recognition (ICCR-08)", April 10-12, 2008, Mysore, INDIA, 2008.
	• **CSIR travel award** (Rs. 35,000) to attend Wavelet Applications in Industrial Processing VI, IS&T/SPIE International Symposium on Electronic Imaging - 2009, San Jose, California, USA, January 2009.

Achievements	• Listed in Marquis Who's Who in the World 2010 and 2012.
	• I have total citation counts of 242 for all the publications published since 2008. 🖳
	• One of my papers entitled "A new robust reference watermarking scheme based on DWT-SVD" published in the journal Computer Standard and Interfaces is among the most cited papers since 2007. 🖳
	• One of my papers entitled "Selective image encryption based on pixels of interest and singular value decomposition" published in the journal Digital Signal Processing is appeared on third position in the listing for most downloaded articles. 🖳🖳
	• One of my papers entitled "A new facet in robust digital watermarking framework" published in the International Journal of Electronics and Communications is appeared on second position in the listing for Top 25 Hottest articles. 🖳
	• One more papers entitled "A new robust adjustable logo watermarking scheme" published in the journal Computer & Security has appeared in the listing for Top 25 Hottest articles. 🖳
Membership	• Institute of Electrical and Electronics Engineers (IEEE)
	• Association for Computing Machinery (ACM)
	• Computer Science Teachers Association (CSTA)
	• International Association of Engineers (IAENG)
	• International Association of Online Engineering (IAOE)
	• International Association of Computer Science and Information Technology (IACSIT)

Professional Activities

Journal Referee Service	• IEEE Transactions on Image Processing, IEEE Press
	• IEEE Transactions on Multimedia, IEEE Press
	• IEEE Transactions on Information Forensic and Security, IEEE Press
	• IEEE Transactions on Instrumentation and Measurement, IEEE Press
	• IET Image Processing
	• Future Generation Computer Systems, Elsevier
	• Signal Processing, Elsevier
	• Digital Signal Processing, Elsevier
	• Journal of Systems and Software, Elsevier
	• Robotics and Autonomous Systems, Elsevier
	• Computer and Electrical Engineering, Elsevier
	• Multimedia Tools and Applications, Springer
	• Circuits, Systems and Signal Processing, Springer
	• Neural Computing and Applications, Springer
	• Journal of Electronic Imaging, SPIE
	• Optical Engineering, SPIE
	• ETRI Journal, ETRI Press
Conference Referee Service	• IEEE Symposium on Industrial Electronics & Applications, Langkawi Island, Malaysia, September 25-28, 2011.
	• International Conference on the Applications of Digital Information and Web Technologies, London Metropolitan University, UK, August 4-6, 2009.
	• International Conference on Networked Digital Technologies, VSB-Technical University, Ostrava, Czech Republic, July 29-31, 2009.
	• International Conference on the Applications of Digital Information and Web Technologies, VSB-Technical University, Ostrava, Czech Republic, August 4-6, 2008.

Others	Proctoring in IEEEXtreme Programming Competition 2011
	• *Institute*: University of Windsor, ON, Canada.
	• *Team*: CVSSWindsor
	• *Team Members*: Dibyendu Mukherjee and Ashirbani Saha

Language Efficiency

	Read	Write	Speak
English	Fluent	Fluent	Fluent
Hindi	Fluent	Fluent	Fluent
(Mother Tongue)			

Software Exposure

Computing Platforms	Windows & Linux
Programming Languages	C, C++, Matlab, Maple, Mathematica & Scilab
Tools	Open CV, Visualization Toolkit (VTK), MeshLab, Advanced Visualization System (AVS)
Software Packages	MS OFFICE, TEX, LATEX, LyX, SmartDraw

Personal Details

Father's Name	Shri. Hari Mohan Bhatnagar
Mother's Name	Shmt. Sangeeta Bhatnagar
Date of Birth	November 21, 1983
Nationality	Indian
Gender	Male
Marital Status	Married
Spouse	Mrs. Divya Bhatnagar

References

	References are available upon request.