Dr. Ayush Goyal

Curriculum Vita

Education

Ph.D., Computer Science **University of Oxford**, Oxford, U.K. **2013**

B.S., Electrical Engineering **Boise State University** (BSU), Boise, I.D., U.S.A. **2005**
Grade-Point Average (GPA): Perfect 4.0 (out of 4.0)

Employment History

Texas A&M University-Kingsville Sep 2018 – Present
Assistant Professor, Department of Electrical Engineering and Computer Science

Started as a tenure-track assistant professor at Texas A&M University-Kingsville, Department of Electrical Engineering and Computer Science. Teaching both undergraduate and graduate courses in Computer Science, guiding graduate thesis students, and supervising projects, which have been resulting in several journal and conference publications. Applying to grant programs under the National Science Foundation (NSF) such as the Innovations in Graduate Education (IGE) program.

Texas A&M University-Kingsville Sep 2016 – Sep 2018
Visiting Assistant Professor, Department of Electrical Engineering and Computer Science

Joined as a Visiting Assistant Professor at Texas A&M University-Kingsville, Department of Electrical Engineering and Computer Science. I am teaching both undergraduate and graduate courses in Computer Science, guiding graduate thesis students, and supervising projects, which have been resulting in several journal and conference publications. I have also actively been applying to grant programs under the National Science Foundation (NSF) such as the Smart and Connected Health (SCH) program and also Indo-US grant programs under USISTEF.

The Times of India Group University Project May 2016 – Aug 2016
Assistant Professor, Department of Computer Science

I was hired to work as an Assistant Professor at the Times of India Group's upcoming under development university project to be titled Bennett University in its Department of Computer Science and was hired to prepare the course curriculum and syllabus and was hired for teaching introductory courses, such as Introduction to Computer Programming, Introduction to Python, etc.

Amity University June 2014 – May 2016
Assistant Professor, Department of Electronics and Communication Engineering

Projects worked on included design and development of an automatic tuberculosis detection system with screening of acid-fast bacilli from stained smear images using line filtering in combination with color image processing, automatic ultraviolet radiation surgical sterilization device based on thermal infrared microscopy imaging of the surface of the instrument being sterilized, and mobile ECG-based remote patient monitoring system.

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Tulane University July 2013 – May 2014

Postdoctoral Research Fellow, Department of Computer Science

Algorithms were designed to redesign protein sequences to be optimized for improved stability or functionality by decreasing their total energy. Side chain packing and design was performed on residues in the hydrophobic cores of the proteins that were allowed to mutate in terms of their rotamers (conformational isomerisms) and amino acid types to obtain de novo protein sequences.

King's College London Feb 2011 – March 2013

Research Assistant, Biomedical Engineering Department

Three dimensional blood vessel networks were modeled computationally after being automatically segmented, extracted, and reconstructed from patient data of MRI and CT images. Blood flow was simulated in the vasculatures to computationally model coronary artery disease.

University of Oxford Oct 2007 – March 2013

Ph.D. Student, Computational Biology Group

PhD project - extracting blood vessel information, such as radii, branching angles, bifurcations, trifurcations, and merging points from cryomicrotome images to create a 3D reconstruction of the porcine coronary vasculature, which can be used for blood flow simulation.

Hewlett-Packard Company, Inc. June 2006 – Aug 2007

Software Test and Verification Engineer

Developed test scripts in Python for testing the upgrades on enterprise virtual array firmware and updates on HP-UX operating system installed on servers, which were used to control data storage on the virtual arrays.

Boise State University January – May 2006

Graduate Research Assistant

In the FAA funded ACER (Airliner Cabin Environment Research), programmed PIC micro-controllers in C to be implemented in a ZigBee wireless sensor network, which will be used in plane cabins to collect and record sensor measurements of unwanted chemicals, contaminants, and pollutants in the air.

Micron Technology Inc. May – Aug 2004

DRAM Product Engineer

Documented row-to-column shorts in 512M DDR DRAM packaged parts. Characterized the effect of GIDL versus junction leakage in DDR DRAM parts. Simulated DRAM integrated circuit models using DF2 schematics on a Sun Workstation.

Boise State University May – Aug 2003

Undergraduate Research Assistant

In the Idaho BRIN (Biomedical Research Infrastructure Network) project, produced 3-D models of the pediatric knee by segmenting and region-growing MRI scans in MIMICS software. Created a MATLAB image processing routine that automatically increased the contrast between growth plate and bone tissue in MRI DICOM files.

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List of Courses Taught

All courses taught at Texas A&M University – Kingsville.

- CSEN 5325 – Software Engineering (2 times)
- CSEN 5323 – Computer Communication Networks (4 times)
- CSEN 5314 – Database Systems (3 times)
- CSEN 5306 – Thesis (2 times)
- CSEN 5305 – Graduate Research Project (3 times)
- CSEN 5303 – Bioinformatics Computing (3 times)
- EEEN 5303 – Broadband Networks (2 times)
- CSEN 5303 – Cloud Computing (1 time)
- CSEN 5303 – Mobile App Programming (1 time)
- CSEN 5303 – Studies on Current Research (2 times)
- CSEN 4336 – Special Problems (1 time)
- CSEN 4332 – Web Mobile App Dev (2 times)
- CSEN 3331 – iOS Mobile App Dev (1 time)
- CSEN 3315 – Computer Graphics (2 times)
- CSEN 3314 – Database Systems (2 times)
- CSEN 2306 – Object-Oriented Programming (1 time)
- CSEN 2304 – Introduction to Computer Science (2 times)
- UNIV 1101 – Learning in Global Context I (3 times)

Publications

Refereed Journal Articles

1. **Goyal, A.**, Lee, J., Lamata, P., van den Wijngaard, J., van Horssen, P., Spaan, J., & Smith, N. P. "Model-based vasculature extraction from optical fluorescence cryomicrotome images." *IEEE Transactions on Medical Imaging*, vol. 32, no. 1, pp. 56-72, 2013.
2. Michler, C., Cookson, A. N., Chabiniok, R., Hyde, E., Lee, J., Sinclair, M., Sochi, T., **Goyal, A.**, Vigueras, G., Nordsletten, D.A., Smith, N.P. "A computationally efficient framework for the simulation of cardiac perfusion using a multicompartment Darcy porousmedia flow model." *International Journal for Numerical Methods in Biomedical Engineering*, vol. 29, no. 2, pp. 217-232, 2013.
3. Hyde, E.R., Cookson, A.N., Lee, J., Michler, C., **Goyal, A.**, Sochi, T., Chabiniok, R., Sinclair, M., Nordsletten, D.A., Spaan, J., van den Wijngaard, J.P.H.M., Siebes, M., & Smith, N.P. "Multi-Scale Parameterisation of a Myocardial Perfusion Model Using Whole-Organ Arterial Networks." *Annals of Biomedical Engineering*, vol. 42, no. 4, pp. 797-811, 2014.
4. **Goyal, A.**, "Image-based Clustering and Connected Component Labeling for Rapid Automated Left and Right Ventricular Endocardial Volume Extraction and Segmentation in Full Cardiac Cycle Multi-frame MRI Images of Cardiac Patients," *Medical & Biological Engineering & Computing*, Springer, DOI: 10.1007/s11517-019-01952-9. https://doi.org/10.1007/s11517-019-01952-9.
5. **Goyal, A.**, Tirumalasetty, S., Hossain, G., Challoo, R., Arya, M., Agrawal, R., Agrawal, D., "Development of a Standalone Independent Graphical User Interface for Neurological Disease Prediction With Automated

Extraction and Segmentation of Gray and White Matter in Brain MRI Images," *Journal of Healthcare Engineering*, Accepted (in press).

6. Sikarwar, B.S., Roy, M.K., Ranjan, P., **Goyal, A.**, "Automatic Disease Screening Method Using Image Processing for Dried Blood Microfluidic Drop Stain Pattern Recognition", *Journal of Medical Engineering and Technology*, Taylor & Franics, Vol. 40, No. 5, pp. 245-254, 2016.
7. Dubey, A., Sharma, P., **Goyal, A.**, "Efficient Computing in Image Processing and DSPs with ASIP Based Multiplier," *Recent Patents on Engineering* (E-pub Ahead of Print), Bentham Science, DOI: 10.2174/1872212112666180810150 35, 2018.
8. Duta, M., Thiyagalingam, J., Trefethen, A., **Goyal, A.**, Grau, V., Smith, N. "Parallel simulation for parameter estimation of optical tissue properties." *Lecture Notes in Computer Science (LNCS)*, Vol. 6272, pp. 51-62, Springer, 2010.
9. Agarwal, P., Kahlon, S.S., Bisht, N., Dash, P., Ahuja, S. and **Goyal, A.**, "Abandoned Object Detection and Tracking Using CCTV Camera." *Lecture Notes in Networks and Systems*, Vol. 10, pp. 483-492. Springer, 2018.
10. Chhabra, M., and **Goyal, A.** "Accurate and Robust Iris Recognition Using Modified Classical Hough Transform." *Lecture Notes in Networks and Systems*, Vol. 10, pp. 493-507. Springer, 2018.
11. Gaurav, D., Yadav, J.K.P.S., Kaliyar, R.K., **Goyal, A.**, "Detection of False Positive Situation in Review Mining," *Advances In Intelligent Systems and Computing*, Vol. 900, pp. 83-90, Springer, DOI: https://doi.org/10.1007/978-981-13-3600-3_8.
12. Sikarwar, B.S., Roy, M.K., Ranjan, P., **Goyal, A.** "Imaging-Based Method for Precursors of Impending Disease from Blood Traces." *Advances in Intelligent Systems and Computing* Vol. 468, pp. 411-424, Springer, 2016.
13. Bhan, A., Bathla, D., **Goyal, A.** "Patient-Specific Cardiac Computational Modeling Based on Left Ventricle Segmentation from Magnetic Resonance Images." *Advances in Intelligent Systems and Computing* Vol. 469, pp. 179-187, Springer, 2016.
14. Sikarwar, B.S., Roy, M.K., Ranjan, P., **Goyal, A.** "Automatic Pattern Recognition for Detection of Disease from Blood Drop Stain Obtained with Microfluidic Device." *Advances in Intelligent Systems and Computing*, Vol. 425, pp. 655-667. Springer, 2015.
15. Ray, V., **Goyal, A.** "Automatic Left Ventricle Segmentation in Cardiac MRI Images Using a Membership Clustering and Heuristic Region-Based Pixel Classification Approach." *Advances in Intelligent Systems and Computing*, Vol. 425, pp. 615-623. Springer, 2015.
16. **Goyal, A.**, Tirumalasetty, S., Bathla, D., Arya, M.K., Agrawal, R., Ranjan, P., Hossain, G., Challoo, R., "A Computational Segmentation Tool for Processing Patient Brain MRI Image Data to Automatically Extract Gray and White Matter Regions," *Advances In Intelligent Systems and Computing*, Springer, Accepted (in press), 2018.
17. Sharma, P., Dubey, A.K., **Goyal, A.**, "Efficient Image de-blurring using alpha plane blending on images recovered with linearly varied PSF (Point Spread Function)", *Advances In Intelligent Systems and Computing*, Springer, Accepted (in press), 2018.
18. Bhattacharya, S., Bhan, A., **Goyal, A.**, "Hybrid Segmentation of Malaria-Infected Cells in Thin Blood Slide Images," *Advances In Intelligent Systems and Computing*, Springer, Accepted (in press), 2018.
19. **Goyal, A.**, Bathla, D., Manikanta, S.D.P.M.L.V., Hossain, G., Challoo, R., Dubey, A.K., Bhan, A., Ranjan, P., "A Graphical Computational Tool for Computerized Ventricular Extraction in Magnetic Resonance Cardiac Imaging," *Advances In Intelligent Systems and Computing*, Springer, Accepted (in press), 2018.

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Refereed Proceedings

1. **Goyal, A.**, van den Wijngaard, J., van Horssen, P., Grau, V., Spaan, J., Smith, N. "Intramural spatial variation of optical tissue properties measured with fluorescence microsphere images of porcine cardiac tissue." *Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pp. 1408-1411, IEEE, 2009.
2. Pandey, S.R., **Goyal, A.**, Hicks, D., "A Blood Pressure and Heartbeat Anomaly Detection and Notification Mobile Application System (BPHADNS)," *5th Annual Conference on Computational Science & Computational Intelligence (CSCI'18)*, Las Vegas, Nevada, USA, December 13-15, 2018, IEEE, Accepted (in press).
3. Makkar, T., Kumar, Y., Dubey, A.K., **Goyal, A.**, "A Generalized State of the Art Model for Precise Visualization and Analysis of Defected Portions of Fruits using Choice Based Segmentation Technique," *International Conference on Computational Science and Computational Intelligence (CSCI-2017)*, Las Vegas, Nevada, USA, 14th-16th December 2017, pp. 495-500, IEEE, 2017.
4. **Goyal, A.**, Arya, M.K., Agrawal, R., Agrawal, D., Hossain, G., Challoo, R., "Automated segmentation of gray and white matter regions in brain MRI images for computer aided diagnosis of neurodegenerative diseases." *International Conference on Multimedia, Signal Processing and Communication Technologies (IMPACT-2017)*, 24th-26th November 2017, pp. 204-208, IEEE, 2017.
5. **Goyal, A.**, Arya, M.K., Agrawal, R., Jothi, A., Dubey, A.K., Tirumalasetty, S., Hossain, G., Challoo, R., "Segmentation Tool for Extracting Gray and White Matter Regions in Brain MRI Images for Cognitive Diseases." *4th International Conference on Computational Intelligence & Communication Technology (CICT-2018)*, pp. 1-6, IEEE, 2018.
6. Makkar, T., Kumar, Y., Dubey, A.K., Rocha, A., **Goyal, A.**, "Analogizing Time Complexity of KNN and CNN in Recognizing Handwritten Digits," *Fourth International Conference on Image Information Processing (ICIIP-2017)*, 21st-23rd December 2017, pp. 1-6, IEEE, 2017.
7. Singhal, P., Dubey, A.K., **Goyal, A.**, "A Comparative Approach for Image Segmentation to Identify the Defected Portion of Apple," *Sixth International Conference on Reliability, Infocom Technologies and Optimization (ICRITO-2017)*, 20th-22nd September 2017, pp. 604-608, IEEE, 2017.
8. Sharma, M., Kanwal, S., Bhan, A., **Goyal, A.**, "Computer Based Diagnosis of Leukemia in Blood Samples Using Improved Region Based Deformable Models." *2nd International Conference on Trends in Electronics and Informatics (ICOEI-2018)*, pp. 1437-1441, IEEE, 2018.
9. Tirumalasetty, S., Patlolla, V.R., Tirumalasetty, R., Arya, M.K., Agrawal, R., Hossain, G., Jothi, A., Dubey, A.K., Challoo, R., **Goyal, A.**, "Graphical Computational Tool for Segmentation of Gray and White Matter Regions in Brain MRI Images." *International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET-2018)*, pp. 1-7, IEEE, 2018.
10. Sharma, D., Bhan, A., **Goyal, A.**, "Cervical Cancer Screening in Pap Smear Images Using Improved Distance Regularized Level Sets." *2nd International Conference on Trends in Electronics and Informatics (ICOEI-2018)*, pp. 1445-1448, IEEE, 2018.
11. Bhan, A., **Goyal, A.**, Chauhan, N. & Wang, C.W. "Feature Line Profile Based Automatic Detection of Dental Caries in Bitewing Radiography." *International Conference on Micro-Electronics and Telecommunication Engineering (ICMETE)*, pp. 635-640, IEEE, 2016.
12. Bhan, A., **Goyal, A.**, & Ray, V. "Fast Fully Automatic Multiframe Segmentation of Left Ventricle in Cardiac MRI Images Using Local Adaptive K-Means Clustering and Connected Component Labeling." *2nd International Conference on Signal Processing and Integrated Networks (SPIN)*, pp. 114-119, IEEE, 2015.
13. Bhan, A., **Goyal, A.**, Dutta, M.K., Sankhla, D., Khanna, P., Travieso, C.M., & Hernandez, J.B.A. "Left ventricle wall extraction in cardiac MRI using region based level sets and vector field convolution." *4th International Work Conference on Bioinspired Intelligence (IWOBI)*, pp. 133-138, IEEE, 2015.

14. Bhan, A., **Goyal, A.**, Dutta, M.K., Riha, K., Omran, Y. "Image-Based Pixel Clustering and Connected Component Labeling in Left Ventricle Segmentation of Cardiac MR Images." *7th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT)*, pp. 339-342, IEEE, 2015.
15. Ray, V., **Goyal, A.** "Image based sub-second fast fully automatic complete cardiac cycle left ventricle segmentation in multi frame cardiac MRI images using pixel clustering and labelling." *8th International Conference on Contemporary Computing (IC3)*, pp. 248-252, IEEE, 2015.
16. Ray, V., **Goyal, A.** "Image-Based Fuzzy C-Means Clustering And Connected Component Labeling Subsecond Fast Fully Automatic Complete Cardiac Cycle Left Ventricle Segmentation In Multi Frame Cardiac MRI Images." *International Conference on Systems in Medicine and Biology (ICSMB)*, pp. 36-40, IEEE, 2016.
17. Sharma, P., Sharma, S., **Goyal, A.** "An MSE (mean square error) based analysis of deconvolution techniques used for deblurring/restoration of MRI and CT Images." *2nd International Conference on Information and Communication Technology for Competitive Strategies (ICTCS-2016)*, March 04-05, 2016, p. 51, ACM – ICPS Proceedings, Vol. ISBN 978-1-4503-3962-9/16/03, DOI: http://dx.doi.org/10.1145/2905055.2905257, 2016.
18. **Goyal, A.**, Bathla, D., Sharma, P., Sahay, M., Sood, S. "MRI Image Based Patient Specific Computational Model Reconstruction of the Left Ventricle Cavity and Myocardium." *2016 International Conference on Computing, Communication and Automation (ICCCA)*, pp. 1065-1068, IEEE, 2016.
19. Sharma, P., Dubey, A.K., Sharma, S., **Goyal, A.**, "Efficient Computing in Image Processing and DSPs with ASIP based Multiplier – Accumulator using Modified Booth and Wallace Tree Algorithm," *International Conference on Smart Technologies in Computer and Communication (SmartTech-2017)*, 27th-29th March 2017 (accepted, in press).
20. Roy, M.K., **Goyal, A.**, Kumar, V. "Ecoflush-Wastewater Recycling And Rainwater Harvesting Toilet Flush System." *1st International Conference on Advancements and Recent Innovations in Mechanical, Production, and Industrial Engineering (ARIMPIE 2015), ELK Asia Pacific Journals – Special Issue*, 2015.

Refereed Abstracts

1. Roy, M., Sikarwar, B.S., **Goyal, A.** "Design and Fabrication of A Microfluidic Device For Measuring Surface Tension of Biological Fluid." *Indian International Science Festival (IISF)*, IIT Delhi, 4-8th December, 2015.
2. Roy, M., Sikarwar, B.S., Prakash, R., Ranjan, P. **Goyal, A.** "Parametric Study of Ball and Socket Joint for Bio-Mimicking Exoskeleton." *17th International Conference on Foot and Ankle Biomechanics (ICFAB), International Journal of Biological, Biomolecular, Agricultural, Food and Biotechnological Engineering, World Academy of Science, Engineering, and Technology (WASET)*, 2015.
3. Sikarwar, B.S., Roy, M., **Goyal, A.**, Ranjan, P. "Innovative Screening Tool Based on Physical Properties of Blood." *17th International Conference on Biomechanics, Biophysics and Bioengineering (ICBBB), International Journal of Biological, Biomolecular, Agricultural, Food and Biotechnological Engineering, World Academy of Science, Engineering, and Technology (WASET)*, 2015.

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Presentations

Refereed Paper Presentations at Conferences

1. **Goyal, A.**, van den Wijngaard, J., van Horssen, P., Grau, V., Spaan, J., Smith, N. "Intramural spatial variation of optical tissue properties measured with fluorescence microsphere images of porcine cardiac tissue." *Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pp. 1408-1411, IEEE, 2009.
2. Pandey, S.R., **Goyal, A.**, Hicks, D., "A Blood Pressure and Heartbeat Anomaly Detection and Notification Mobile Application System (BPHADNS)," *5th Annual Conference on Computational Science & Computational Intelligence (CSCI'18)*, Las Vegas, Nevada, USA, December 13-15, 2018, IEEE, Accepted (in press).
3. Makkar, T., Kumar, Y., Dubey, A.K., **Goyal, A.**, "A Generalized State of the Art Model for Precise Visualization and Analysis of Defected Portions of Fruits using Choice Based Segmentation Technique," *International Conference on Computational Science and Computational Intelligence (CSCI-2017)*, Las Vegas, Nevada, USA, 14th-16th December 2017, pp. 495-500, IEEE, 2017.
4. **Goyal, A.**, Arya, M.K., Agrawal, R., Agrawal, D., Hossain, G., Challoo, R., "Automated segmentation of gray and white matter regions in brain MRI images for computer aided diagnosis of neurodegenerative diseases." *International Conference on Multimedia, Signal Processing and Communication Technologies (IMPACT-2017)*, 24th-26th November 2017, pp. 204-208, IEEE, 2017.
5. **Goyal, A.**, Arya, M.K., Agrawal, R., Jothi, A., Dubey, A.K., Tirumalasetty, S., Hossain, G., Challoo, R., "Segmentation Tool for Extracting Gray and White Matter Regions in Brain MRI Images for Cognitive Diseases." *4th International Conference on Computational Intelligence & Communication Technology (CICT-2018)*, pp. 1-6, IEEE, 2018.
6. Makkar, T., Kumar, Y., Dubey, A.K., Rocha, A., **Goyal, A.**, "Analogizing Time Complexity of KNN and CNN in Recognizing Handwritten Digits," *Fourth International Conference on Image Information Processing (ICIIP-2017)*, 21st-23rd December 2017, pp. 1-6, IEEE, 2017.
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8. Sharma, M., Kanwal, S., Bhan, A., **Goyal, A.**, "Computer Based Diagnosis of Leukemia in Blood Samples Using Improved Region Based Deformable Models." *2nd International Conference on Trends in Electronics and Informatics (ICOEI-2018)*, pp. 1437-1441, IEEE, 2018.
9. Tirumalasetty, S., Patlolla, V.R., Tirumalasetty, R., Arya, M.K., Agrawal, R., Hossain, G., Jothi, A., Dubey, A.K., Challoo, R., **Goyal, A.**, "Graphical Computational Tool for Segmentation of Gray and White Matter Regions in Brain MRI Images." *International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET-2018)*, pp. 1-7, IEEE, 2018.
10. Sharma, D., Bhan, A., **Goyal, A.**, "Cervical Cancer Screening in Pap Smear Images Using Improved Distance Regularized Level Sets." *2nd International Conference on Trends in Electronics and Informatics (ICOEI-2018)*, pp. 1445-1448, IEEE, 2018.
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12. Bhan, A., **Goyal, A.**, & Ray, V. "Fast Fully Automatic Multiframe Segmentation of Left Ventricle in Cardiac MRI Images Using Local Adaptive K-Means Clustering and Connected Component Labeling." *2nd International Conference on Signal Processing and Integrated Networks (SPIN)*, pp. 114-119, IEEE, 2015.

13. Bhan, A., **Goyal, A.**, Dutta, M.K., Sankhla, D., Khanna, P., Travieso, C.M., & Hernandez, J.B.A. "Left ventricle wall extraction in cardiac MRI using region based level sets and vector field convolution." *4th International Work Conference on Bioinspired Intelligence (IWOBI)*, pp. 133-138, IEEE, 2015.
14. Bhan, A., **Goyal, A.**, Dutta, M.K., Riha, K., Omran, Y. "Image-Based Pixel Clustering and Connected Component Labeling in Left Ventricle Segmentation of Cardiac MR Images." *7th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT)*, pp. 339-342, IEEE, 2015.
15. Ray, V., **Goyal, A.** "Image based sub-second fast fully automatic complete cardiac cycle left ventricle segmentation in multi frame cardiac MRI images using pixel clustering and labelling." *8th International Conference on Contemporary Computing (IC3)*, pp. 248-252, IEEE, 2015.
16. Ray, V., **Goyal, A.** "Image-Based Fuzzy C-Means Clustering And Connected Component Labeling Subsecond Fast Fully Automatic Complete Cardiac Cycle Left Ventricle Segmentation In Multi Frame Cardiac MRI Images." *International Conference on Systems in Medicine and Biology (ICSMB)*, pp. 36-40, IEEE, 2016.
17. Sharma, P., Sharma, S., **Goyal, A.** "An MSE (mean square error) based analysis of deconvolution techniques used for deblurring/restoration of MRI and CT Images." *2nd International Conference on Information and Communication Technology for Competitive Strategies (ICTCS-2016)*, March 04-05, 2016, p. 51, ACM – ICPS Proceedings, Vol. ISBN 978-1-4503-3962-9/16/03, DOI: http://dx.doi.org/10.1145/2905055.2905257, 2016.
18. **Goyal, A.**, Bathla, D., Sharma, P., Sahay, M., Sood, S. "MRI Image Based Patient Specific Computational Model Reconstruction of the Left Ventricle Cavity and Myocardium." *2016 International Conference on Computing, Communication and Automation (ICCCA)*, pp. 1065-1068, IEEE, 2016.
19. Sharma, P., Dubey, A.K., Sharma, S., **Goyal, A.**, "Efficient Computing in Image Processing and DSPs with ASIP based Multiplier – Accumulator using Modified Booth and Wallace Tree Algorithm," *International Conference on Smart Technologies in Computer and Communication (SmartTech-2017)*, 27th-29th March 2017 (accepted, in press).
20. Roy, M., Sikarwar, B.S., **Goyal, A.** "Design and Fabrication of A Microfluidic Device For Measuring Surface Tension of Biological Fluid." *Indian International Science Festival (IISF)*, IIT Delhi, 4-8th December, 2015.
21. Roy, M.K., **Goyal, A.**, Kumar, V. "Ecoflush-Wastewater Recycling And Rainwater Harvesting Toilet Flush System." *1st International Conference on Advancements and Recent Innovations in Mechanical, Production, and Industrial Engineering (ARIMPIE 2015), ELK Asia Pacific Journals – Special Issue*, 2015.

Research Activities

Grants with Decisions Pending

1) National Science Foundation (NSF), Program: Smart and Connected Health (SCH), Title: "SCH: INT: RUI: Design and Development of a Smart Home Health Monitoring System with Machine Learning Based Disease Prediction for Hypertension and Diabetes Patients." PI: Dr. Ayush Goyal (Asst. Prof. EECS), Co-PIs: Prof. Dr. Gahangir Hossain (Asst. Prof, EECS), Prof. Dr. Rajab Challoo (Ex-Chair and Professor, EECS). Requested $311,567. Submitted December, 2018.
2) National Science Foundation (NSF), Program: Innovations in Graduate Education (IGE), Title: "IGE: TAMU-K Biomedical Robotics, Automation, and Computer Vision Lab." PI: Dr. Ayush Goyal (Asst. Prof., EECS), Co-PIs: Prof. Dr. Gahangir Hossain (Asst. Prof, EECS), Prof. Dr. Rajab Challoo (Ex-Chair and Professor, EECS), Prof. Dr. David Hicks (Assoc. Prof. and Asst.

Chair, EECS), Prof. Dr. Lifford McLauchlan (Assoc. Prof. and Asst. Chair, EECS). Requested $352,279. Submitted September, 2018.

Grants Submitted but Not Funded

1) National Science Foundation (NSF), Program: Smart and Connected Health (SCH), Title: "SCH: INT: Design & Development of an Automatic Microscope with Embedded Image Analysis Algorithms Programmed into an Integrated DSP for Infection Detection from Stain Smears." PI: Dr. Ayush Goyal (Asst. Prof., EECS), Co-PIs: Prof. Dr. Gahangir Hossain (Asst. Prof, EECS), Prof. Dr. Rajab Challoo (Ex-Chair and Professor, EECS). Requested $397,910. Submitted May, 2018.
2) National Science Foundation (NSF), Program: Smart and Autonomous Systems (S&AS), Title: "S&AS: RUI: FND: Design & Development of an Automatic Microscope with Embedded Image Analysis Algorithms Programmed into an Integrated DSP for Infection Detection from Stain Smears." PI: Dr. Ayush Goyal (Asst. Prof., EECS), Co-PIs: Prof. Dr. Gahangir Hossain (Asst. Prof, EECS), Prof. Dr. Rajab Challoo (Ex-Chair and Professor, EECS). Requested $368,154. Submitted December, 2016.
3) National Aeronautics and Space Administration (NASA), Program: NASA SUITS 2018 (Undergraduate Student Research Competition), Title: "Augmented Reality Informatics Subsystem for Astronaut Spacesuits using the Microsoft HoloLens Platform." Faculty Mentors: Dr. Ayush Goyal (Asst. Prof., EECS), Prof. Dr. Gahangir Hossain (Asst. Prof, EECS), Prof. Dr. Rajab Challoo (Ex-Chair and Professor, EECS). Undergraduate Student Researchers: Nicholas Bishop, Audrey Lopez, Juan Farias, Kevin De Angeli. Requested $6,007. Submitted December 2017.

Professional Growth Activities

Professional Service Activities

- Technical Program Committee Member, International Conference on Signal Processing and Integrated Networks (SPIN-2016), IEEE Conference, 2016.
- Technical Program Committee Member, International Conference on Signal Processing and Integrated Networks (SPIN-2019), IEEE Conference, 2019.
- Reviewer, International Journal of Engineering
- Invited Editorial Board Member, JIIT Journal (to be started)

Attendance at Professional Meetings

Registered to participate in the following sessions offered by the Office of Research & Sponsored Programs:

- January 30, 2018, College Hall, Rm 147 (12 – 1 p.m.) Peer Review Groups Meeting
- February 1, 2018, College Hall, Rm 147 (12 – 1 p.m.) NSF FastLane
- February 8, 2018, College Hall, Rm 147 (12 – 1 p.m.) Budget Basics
- February 15, 2018, College Hall, Rm 147 (12 – 1 p.m.) Building & Enhancing the STEM Pipeline
- February 16, 2018, Rhode Hall, Rm 243 (12 – 1 p.m.) GrantSearch Tool
- February 22, 2018, Student Union, Rm 219A (2 – 4 p.m.) Speed Networking for Researchers
- March 9, 2018, Rhode Hall, Rm 243 (12 – 1 p.m.) GrantSearch Tool
- March 22, 2018, College Hall, Rm 147 (12 – 1 p.m.) Getting the Reviewer's Attention

- April 12, 2018, College Hall, Rm 147 (12 – 1 p.m.) What's the Big Idea? Establishing Goals & Objecti
- April 13, 2018, Rhode Hall, Rm 243 (12 – 1 p.m.) GrantSearch Tool

Service Activities

Committee Memberships

- College of Engineering Graduate Merit Scholarships Committee, 2018, Member.

Other University Service

- Students doing research with me presented posters and won prizes at research symposiums:
    - My graduate master's thesis student Sunayana Tirumalasetty working under me and Prof. Gahangir Hossain won 1st place prize at the 10th Annual Javelina Research Symposium held on September 26, 2017 at Texas A&M University – Kingsville for her research poster entitled "Graphical Computational Tool for Segmentation of Gray and White Matter in Brain MRI Images."
    - My graduate master's thesis student Sunayana Tirumalasetty working under me and Prof. Gahangir Hossain won 1st place prize at the 14th Annual Pathways Research Symposium held on November 2-3, 2017 at Tarleton State University for her research poster entitled "Graphical Computational Tool for Segmentation of Gray and White Matter in Brain MRI Images."
    - My graduate master's thesis student Himani Bedekar won 2nd place prize at the 14th Annual Pathways Research Symposium held on November 2-3, 2017 at Tarleton State University for her research poster on "Pervasive Fog Computing for Remote Patient Monitoring."
    - My graduate master's thesis student Chandan Rao Ramesh working under me and Prof. Lifford McLauchlan won 1st place prize at the 12th Annual Javelina Research Symposium on September 26, 2018 at Texas A&M University – Kinsgville.
    - My graduate master's thesis student Saswat Raj Pandey working under me and Prof. David Hicks won 2nd place prize in Engineering and Computer Science at the 15th Annual Pathways Student Research Symposium held November 1-2, 2018 at West Texas A&M University.
    - My graduate master's thesis student Chandan Rao Ramesh working under me and Prof. Lifford McLauchlan won 3rd place prize in Engineering and Computer Science at the 15th Annual Pathways Student Research Symposium held November 1-2, 2018 at West Texas A&M University.
    - My graduate master's thesis students working with me – Saswat Raj Pandey and Chandan Rao Ramesh – presented their research posters at the 12th Annual Javelina Research Symposium on September 26, 2018 at Texas A&M University – Kinsgville.
    - My graduate master's thesis students working with me – Saswat Raj Pandey and Chandan Rao Ramesh – presented their research posters at the 15th Annual Pathways Student Research Symposium held November 1-2, 2018 at West Texas A&M University.
    - My graduate master's thesis student Chandan Rao Ramesh working under me and Prof. Lifford McLauchlan presented his research at the Student Research Forum of The Honor Society of Phi Kappa Phi at Texas A&M University-Kingsville on November 13, 2018.
- Worked with other EECS faculty and edited a proposal for reorganization of MS in CS program at TAMUK.

- Participated as a faculty mentor and volunteer judge in research symposiums:
    - I volunteered as a faculty mentor and judge at the 10th Annual Javelina Research Symposium on September 26, 2017 at Texas A&M University – Kingsville.
    - I participated as a faculty mentor for graduate student posters at the 14th Annual Pathways Research Symposium held on November 2-3, 2017 at Tarleton State University.
- Facilitated student poster presentations as a faculty mentor in research symposiums:
    a. I guided master's student graduate level research to be presented as posters at the 12th Annual Javelina Research Symposium on September 26, 2018 at Texas A&M University – Kingsville.
    b. I guided master's student graduate level research as a faculty mentor for graduate student posters at the 15th Annual Pathways Student Research Symposium held on November 1-2, 2018 at West Texas A&M University.
- Coordinated with the student committee members in the TAMUK ACM / IEEE student chapters:
    - Facilitated tutoring sessions for my undergraduate students by graduate students.
    - Invited senior students as guest lecturers in my undergraduate classes.
    - Participated as a faculty mentor in the TAMUK ACM / IEEE student chapter meetings.
- Guided and communicated with senior students of TAMUK ACM / IEEE student chapters:
    a. Coordinated sending their student members messages to raise awareness amongst student members of research experiences for undergraduates.
    b. Mentored or guided the following undergraduate students in their undergraduate research work, IEEE/ACM student chapters, or hackathon or other computing competition events:
        i. Christopher Cavazos
        ii. Stephanie Garza
- Mentored (as chair, co-chair, or member on thesis committees) of these graduate level masters students in their thesis research and thesis writing with regular discussions and coding sessions in which I helped them brainstorm on novel methods for their research problems, debugging their code, and in writing their thesis chapters:
    a. Students whose masters research I mentored and currently mentor as the chairman of their thesis committee and who started their research work for their thesis in 2018:
        i. Tanvi A. Bansod
        ii. Harshil Pareshkumar Trivedi
        iii. Anirban Sarkar
        iv. Gomanth Bere
    b. Students whose masters research I mentored and currently mentor as the co-chair of their thesis committee and who started their thesis in 2018:
        i. Saswat Raj Pandey
        ii. Nitin Kanagaraj
    c. Students whose masters research I mentored and currently mentor as the member of their thesis committee and who started their thesis in 2018:
        i. Hithashree Chikkanna Manchaiah
        ii. Chandan Rao Ramesh
    d. Students who I mentored as a co-chair for their thesis who finished their thesis in 2018 and for whose thesis, I was the main guide who gave them their topic and research idea:
        i. Sunayana Tirumalasetty
        ii. Shreedevi Bugudanahalli Anandamurthy
        iii. Sai Durga Prasad Matla Leela Venkata Manikanta
        iv. Sushma Kumari Kanuganti

v. Saiteja Prasad Chatrati

e. Students I mentored for their master's thesis who finished their thesis in 2018 for whom other professors were the main guide:
   i. Md Reshad Reza
   ii. Himani R. Bedekar
   iii. Moshiur Rahman (completed defense, but still plans to do defense again)

- Mentored the following undergraduate students in their undergraduate research work with weekly meetings by spending time with them to guide them in their research and help solve their problems or overcome their obstacles and show new methods or ways to come up with solutions (for the NASA SUITS 2018 proposal we prepared):
  a. Nicholas Bishop
  b. Dagoberto Garza
  c. Kevin De Angeli
- Advised the following students in their degree plans:
  a. Swenson, Shelby L (K00313908)
  b. Moreno, Ivan F (K00354492)
  c. Mccracken, Ashley (K00382945)
  d. Arvizu, Andres J (K00356277)
  e. Borjon, Aliya M (K00349438)
  f. Davis, Levreese J (K00394080)
  g. Flores, Jesse (K00346556)
  h. Gonzalez, Juan R (K00412477)
  i. Rodriguez, Adrian (K00378421)

Community Outreach Efforts

- Presented at several recruitment and outreach events in the year 2018 using presentations and videos of my research and my students' theses research to illustrate the types of research work at our TAMUK EECS department and College of Engineering in surrounding regional schools. I guided the high school students to apply to engineering degree programs at our university. Below is a list of all recruitment and outreach events where I presented and participated in:

Date	**Time**	**Event/School**
24/01/18	9:00-4p.m.	Carroll High School
31/01/18	12-1:30 lunch visits-1:30-2:30 presentation	King High School
01/02/18	2:30-3:30p.m.	South Texas College
09/02/18	8:15 a.m. - 4 p.m.	Robstown High School - Juniors and Seniors (Anatomy and Chemistry students)
23/02/18	2:15-3:15p.m.	E-Week challenge tour
01/03/18	1:30-4:30p.m.	Carroll High School Career Fair (tables set up for displays)
19/04/18	10 - 12 p.m.	Bishop Gariga Middle School (Tour-64 students)

06/09/18	8:00a.m.-3:35p.m. (5th period off)	Gregory-Portland High School (Physics)/Pre-Ap
13/09/18	8-4p.m.*	Driscoll Middle School-Corpus Christi
20/09/18	9a.m.-4:15p.m.	Veterans Memorial High School -Physcis, AP Physics, Robotics
25/09/18	7:45-3:35p.m.	Bishop High School-Engineering classes
04/10/18	9:00a.m.-4p.m.	San Diego High School (Robotics)
06/12/18	4:30 pm - 6:00 pm	Sinton High School

- Presented at several recruitment and outreach events in the year 2017 using multi-media GIFs, clips, and videos of my own and graduate students' research demonstrations to raise awareness of TAMUK EECS and College of Engineering amongst local high school students and encourage them to apply for engineering at TAMUK. List of all recruitment and outreach events where I and/or my graduate students co-jointly presented and/or participated is below:

Date	**Time**	**Event/School**
2/10/2017	10:30AM-11:13AM, 11:20AM-12:00PM, 1:20PM-2:05PM, 2:15PM-3:05PM	West Oso High School
2/24/2017	11:00a.m.-1p.m.	Engineers Week (E-Week) Challenge
3/22/2017	8:50-10:45AM, 10:45AM-1PM, 1:30PM-3:10PM	Moody High School (CITGO Innovation Academy)
3/29/2017	9:30AM-12:15PM	West Oso High School
9/12/2017	1:00p.m.-2p.m.	Counselor update tour 35 - TAMUK ENGINEERING / NNTRC TOUR
9/14/2017	12:30-1:30 LUNCH 1:30p.m.-4p.m.	West Oso High School- Seniors
10/10/2017	8:05a.m.-4:25p.m.	Foy H. Moody High School
11/7/2017	8:48-3p.m.	AVID Sinton High School
11/8/2017	11:00a.m.-11:45a.m.	London High School -TAMUK Engineering tour
11/9/2017	8:00a.m.-12p.m.	Flour Bluff High School Career Fair-gym
11/9/2017	11:00a.m.-11:30a.m.	George West High School-TAMUK Engineering tour
11/16/2017	1:15-2:30p.m.	John Paul High School
12/1/2017	1p.m.-2p.m.	TRIO High School group
12/11/2017	11-12p.m.	Moody High School -Engineering campus tour (40 students)
12/12/2017	11a.m.-12p.m.	San Juan Alamo
12/14/2017	10:00a.m.-11-12p.m.	Family visit-Engineering faculty meeting/tour

Dr. Ayush Goyal

Curriculum Vita

Honors and Awards

- £26000/year Clarendon scholarship to pursue D.Phil. (Ph.D.) at Oxford University.
- $5000/year for three years Micron Foundation Scholarship award for graduate studies.
- Honorable mention as one of the 4 most outstanding Electrical Engineering students in the nation by Eta Kappa Nu Electrical and Computer Engineering Honor Society for year 2005.
- Top Ten Student Award at BSU for year 2005.
- $3,200/year Micron Scholarship from 2003-2004 under Micron Scholar Program.
- $1000 BSU Electrical Engineering Department Scholarship award for 2002-2003.
- Completed Bachelor of Science in Electrical Engineering with perfect 4.0 out of 4.0 GPA at 17 years of age in May of 2005.
- President, Eta Kappa Nu, Electrical and Computer Engineering Honor Society, BSU Local Chapter, 2004-05.
- $250 Merit Scholarship award from National Society of Collegiate Scholars, offered to only the top 50 outstanding undergraduates in the entire USA for the year 2000.
- Outstanding Electrical and Computer Engineering Student award by College of Engineering, BSU.
- Five times on the Dean's List with highest honors since Fall 2001.

Thesis Dissertation and Reports

Goyal A., "Vasculature reconstruction from 3D cryomicrotome images." D.Phil. (Ph.D.) Thesis, University of Oxford, 2013.

Goyal, A., van den Wijngaard, J., van Horsen, P., Smith, N., Spaan, J. "Segmentation of cryomicrotome images leading to vascular coronary tree. One-dimensional analysis of myocardial wall stress." *euHeart Personalised & Integrated Cardiac Care: Patient-specific Cardiovascular Modelling and Simulation for In Silico Disease Understanding & Management and for Medical Device Evaluation & Optimisation.* Grant number: FP7-ICT-2007. IP Contract no: 224495. Deliverable D 8.1.1 Project Report, 2010.

Patents

Roy, M.K., **Goyal, A.**, Dutta, M.K. "An automatic portable DSP processor-based solar/dynamo powered microscope for detection of bacilli." Patent filed. Patent application number: 259/DEL/2015.

Roy, M.K., **Goyal, A.**, Kumar, V. "Waste water recycling and rainwater harvesting automatic photosensor mesh based self-lubricating waste-measuring multilevel flush system." Patent filed. Patent application number: 338/DEL/2015.

Roy, M.K., **Goyal, A.**, Prakash, R., "Economical Eco-Friendly Wax Cube Based Auto Eject Biodegradable Matchstick Holder." Patent filed. Patent application number: 1919/DEL/2015.

Roy, M.K., **Goyal, A.**, Dutta, M.K., "Microprocessor Based Ultraviolet Radiation Sterilizing Device for Medical and Surgical Instruments. Patent filed. Patent application number: 2692/DEL/2015.

Dr. Ayush Goyal

Curriculum Vita

Personal Details

Director (2014-2016), Biomedical Research Consultancy, Noida, U.P.
http://bmrcindia.wix.com/biomedical-research

Clarendon Scholar (2007-2013), Oxford University, Oxfordshire, U.K.
http://www.clarendon.ox.ac.uk/clarendon/scholars-and-alumni/scholar-profiles/details/?id=1186
http://www.cs.ox.ac.uk/people/ayush.goyal/
http://tulane.edu/sse/cs/faculty/post-docs/
http://oxford.academia.edu/AyushGoyal
https://uk.linkedin.com/pub/ayush-goyal/19/62/839