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Education

- 2012 – 2017 **Ph.D., Worcester Polytechnic Institute, USA** in Robotics Engineering
Thesis title: *Towards Closed-loop Robot Assisted, Percutaneous Interventions Under MRI Guidance*
Advisor: Dr. Gregory S. Fischer
- 2005 – 2007 **M.Tech., Nirma University of Science and Technology, India** in Computer Science and Engineering
Thesis title: *Two legged robot design, simulation and realization*
Gold Medal: *Best Student Award*
- 2001 – 2005 **B.E. North Gujarat University, India** in Computer Engineering

Employment History

Research

- 2017 – **Postdoctoral Fellow** Johns Hopkins University
Involved in development of MRI guided robotic system for shoulder arthrography and safe manipulation for robot assisted retinal surgeries.
- 2013 – 2017 **Research Assistant** Robotics Engineering Program, Worcester Polytechnic Institute, Worcester, MA, USA 0109
Developed MRI guided robotic systems for needle steering, prostate biopsy and stereotactic neurosurgery for tumor ablation. The prostate biopsy system has been used for 30 patient trials at Brigham and Womens' Hospital, Boston, USA, while the neurosurgery system has been evaluated in animal model.

Teaching and Mentoring

- 2017 – **Postdoctoral Fellow** Johns Hopkins University
Mentoring three graduate students in AMIRO research lab. Guiding them towards their research goals and providing them technical and intellectual help.
- 2013 – 2013 **Teaching Assistant** Worcester Polytechnic Institute
Conducted lab sessions and graded assignments for undergraduate level course on “UNIFIED ROBOTICS II”
- 2010 – 2012 **Lecturer** Department of Computer Engineering, Nirma University of Science and Technology, Ahmedabad, India
Delivered following courses at undergraduate level: embedded systems, digital electronic, design of operating systems and computer graphics.
Designed and conducted laboratory sessions for the following courses at undergraduate level: digital electronic and design of operating systems .

Industry

- 2008 – 20009 **Software Engineer** ABB - Corporate Research Center, Bangalore, India.
- 2007 – 20008 **Software Engineer** Hewlett Packard, Bangalore, India.

Research Publications

Under Preparation/Review/Revision

- 1 Li, G., **Patel, N.**, Burdette, C., Pilitsis, J., Su, H., & Fischer, G. (Under Review:2018). A fully actuated robotic assistant for mri-guided precision conformal ablation of brain tumors. *IEEE/ASME Transactions on Mechatronics*. IEEE.
- 2 Moreira, P., **Patel, N.**, Wartenberg, M., Li, G., Heffter, T., Burdette, E. C., ... Tokuda, J. (Under Review:2018). Evaluation of robot-assisted mri-guided prostate biopsy: needle path analysis during clinical trials. *Physics in Medicine & Biology*. IOP Publishing.
- 3 **Patel, N.**, Nycz, C., Gondokaryono, R., Carvalho, P., Li, G., Gandomi, K., ... Fischer, G. (In Preparation:2018). Preclinical evaluation of an integrated system for mri-guided robot-assisted neuroablative needle-based therapeutic ultrasound. *IEEE transactions on bio-medical engineering*. IEEE.
- 4 **Patel, N.**, Yan, J., Monfaredi, R., Sharma, K., Cleary, K., & Iordachita, I. (In Preparation:2018[a]). Preclinical evaluation of an integrated robotic system for mri-guided shoulder arthrography. *The International Journal of Medical Robotics and Computer Assisted Surgery*. Wiley Online Library.
- 5 **Patel, N.**, Yan, J., Monfaredi, R., Sharma, K., Cleary, K., & Iordachita, I. (In Preparation:2018[b]). Thiel embalmed cadaver study of shoulder arthrography with a patient-mounted mri compatible robot. *The International Journal of Medical Robotics and Computer Assisted Surgery*. Wiley Online Library.

Journal Articles

- 1 MacDonell, J., **Patel, N.**, Fischer, G., Burdette, E. C., Qian, J., Chumbalkar, V., ..., Gounis, M. et al. (2018). Robotic assisted mri-guided interventional interstitial mr guided focused ultrasound ablation in a swine model. *Neurosurgery*.
- 2 MacDonell, J., **Patel, N.**, Rubino, S., Ghoshal, G., Fischer, G., Burdette, E. C., ... Pilitsis, J. G. (2018). Magnetic resonance-guided interstitial high-intensity focused ultrasound for brain tumor ablation. *Neurosurgical focus*, *44*(2), E11.
- 3 **Patel, N.**, Li, G., Shang, W., Wartenberg, M., Heffter, T., Burdette, E. C., ..., Tempany, C. M. et al. (2018). System integration and preliminary clinical evaluation of a robotic system for mri-guided transperineal prostate biopsy. *Journal of Medical Robotics Research*, 1950001.
- 4 Wartenberg, M., Schornak, J., Gandomi, K., Carvalho, P., Nycz, C., **Patel, N.**, ..., Tokuda, J. et al. (2018). Closed-loop active compensation for needle deflection and target shift during cooperatively controlled robotic needle insertion. *Annals of Biomedical Engineering*, 1–13.
- 5 Frank, T., Krieger, A., Leonard, S., **Patel, N.**, & Tokuda, J. (2017). Ros-igtl-bridge: an open network interface for image-guided therapy using the ros environment. *International journal of computer assisted radiology and surgery*, *12*(8), 1451–1460.
- 6 Su, H., Shang, W., Li, G., **Patel, N.**, & Fischer, G. S. (2017). An mri-guided telesurgery system using a fabry-perot interferometry force sensor and a pneumatic haptic device. *Annals of biomedical engineering*, *45*(8), 1917–1928.
- 7 Eslami, S., Shang, W., Li, G., **Patel, N.**, Fischer, G. S., Tokuda, J., ... Iordachita, I. (2016). In-bore prostate transperineal interventions with an mri-guided parallel manipulator: system development and preliminary evaluation. *The International Journal of Medical Robotics and Computer Assisted Surgery*, *12*(2), 199–213.

Conference Proceedings

- 1 Ebrahimi, A., He, C., Roizenblatt, M., Sefati, S., **Patel, N.**, Gehlbach, P., & Iordachita, I. (2018). Real-time sclera force feedback for enabling safe robot-assisted vitreoretinal surgery. In *Engineering in medicine and biology society (embc), 2018 40th annual international conference of the ieee*. IEEE.
- 2 Gonenc, B., **Patel, N.**, & Iordachita, I. (2018). Evaluation of a force-sensing handheld robot for assisted retinal vein cannulation. In *Engineering in medicine and biology society (embc), 2018 40th annual international conference of the ieee*. IEEE.
- 3 He, C., Ebrahimi, A., Roizenblatt, M., **Patel, N.**, Yang, Y., Gehlbach, P., & Iordachita, I. (2018). User behavior evaluation in robot-assisted retinal surgery. In *Ro-man, 2018 ieee* (pp–). IEEE(Accepted).
- 4 He, C., Roizenblatt, M., **Patel, N.**, Ebrahimi, A., Yang, Y., Gehlbach, P., & Iordachita, I. (2018). Towards bimanual robot-assisted retinal surgery: tool-to-sclera force evaluation. In *Sensors, 2018 ieee* (pp–). IEEE(Accepted).
- 5 **Patel, N.**, Azimi, E., Monfaredi, R., Sharma, K., Cleary, K., & Iordachita, I. (2018). Robotic system for mri-guided shoulder arthrography: accuracy evaluation. In *Medical robotics (ismr), 2018 international symposium on* (pp. 1–6). IEEE.
- 6 **Patel, N.**, Yan, J., Levi, D., Monfaredi, R., Cleary, K., & Iordachita, I. (2018). Body-mounted robot for image-guided percutaneous interventions: mechanical design and preliminary accuracy evaluation. In *Intelligent robots and systems (iros), 2018 ieee/rsj international conference on*. IEEE(Accepted).
- 7 Nycz, C. J., Gondokaryono, R., Carvalho, P., **Patel, N.**, Wartenberg, M., Pilitsis, J. G., & Fischer, G. S. (2017). Mechanical validation of an mri compatible stereotactic neurosurgery robot in preparation for pre-clinical trials. In *Intelligent robots and systems (iros), 2017 ieee/rsj international conference on* (pp. 1677–1684). IEEE.
- 8 Wartenberg, M., **Patel, N.**, Li, G., & Fischer, G. S. (2016). Towards synergistic control of hands-on needle insertion with automated needle steering for mri-guided prostate interventions. In *Engineering in medicine and biology society (embc), 2016 ieee 38th annual international conference of the* (pp. 5116–5119). IEEE.
- 9 **Patel, N.**, van Katwijk, T., Li, G., Moreira, P., Shang, W., Misra, S., & Fischer, G. S. (2015). Closed-loop asymmetric-tip needle steering under continuous intraoperative mri guidance. In *Engineering in medicine and biology society (embc), 2015 37th annual international conference of the ieee* (pp. 4869–4874). IEEE.
- 10 **Patel, N.**, Pradhan, S., & Shah, K. (2009). Two legged robot design, simulation and realization. In *Autonomous robots and agents, 2009. icara 2009. 4th international conference on* (pp. 426–429). IEEE.

References

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