

IULIAN IOAN IORDACHITA Ph.D.
Associate Research Professor
Department of Mechanical Engineering
Whiting School of Engineering, Johns Hopkins University

RESEARCH INTERESTS

Robotics / Medical Robotics / Surgical Robotics
Medical Instrumentation / Smart Surgical Tools
Image-Guided Surgery / Computer Assisted Surgery
Mechanisms and Mechanical Transmissions for Robots

EDUCATION

03/2000-08/2000: **Post-Doctoral Fellow** in Medical Robotics, Brady Urological Institute, School of Medicine, Johns Hopkins University, Baltimore, MD, USA;

01/1992-11/1996: **Doctor Engineer Diploma** (equivalent to **Ph.D.**) in Mechanical Engineering, University of Craiova, Romania

Dissertation: *Contributions to the study of biologically-inspired mechanisms for dragging locomotion.*

09/1988-06/1989: **Diploma of Advanced Studies** (equivalent to **MS**), in Industrial Robots, University of Craiova, Romania,

Thesis: *Mechanical Hands for Industrial Robots*

09/1979–06/1984: **Mechanical Engineer Diploma** (equivalent to **BS & MS**), Specialization - Technology of Mechanical Engineering, University of Craiova, Romania

Thesis: *Industrial Robot actuated with Pneumatic Motors*

09/1974-05/1978: **Diploma of Baccalaureate**, “Nicolae Titulescu” High School, Craiova, Romania

PROFESSIONAL EXPERIENCE

07/2014 – cont.: **Associate Research Professor**, Department of Mechanical

Engineering, Whiting School of Engineering, Johns Hopkins University, Baltimore, MD, USA - research activity

11/2009 – 06/2014: **Assistant Research Professor**, Department of Mechanical Engineering, Whiting School of Engineering, Johns Hopkins University, Baltimore, MD, USA - research activity

07/2007 – 10/2009: **Assoc. Research Scientist**, Center for Computer-Integrated Surgical Systems and Technology, Johns Hopkins University, Baltimore, MD, USA - research activity

04/2004 – 06/2007: **Research Engineer**, Center for Computer-Integrated Surgical Systems and Technology, Johns Hopkins University, Baltimore, MD, USA - research activity

10/2003 – 03/2004: **Associate Professor**, School of Mechanical Engineering, University of Craiova, Romania – teaching and research activity

10/2002 – 09/2003: **Visiting Associate Professor**, Graduate School of Frontier Sciences, The University of Tokyo, JAPAN - research activity

10/1998 – 09/2002: **Associate Professor**, School of Mechanical Engineering, University of Craiova, Romania – teaching and research activity

10/1993 – 09/1998: **Senior Lecturer**, School of Mechanical Engineering, University of Craiova, Romania – teaching and research activity

09/1990 – 09/1993: **Assistant Professor**, School of Mechanical Engineering, University of Craiova, Romania – teaching and research activity

10/1986 – 08/1990: **Research-Design Engineer**, Research and Technology Institute for Electric Motors, Transformers and Electric Apparatus, Craiova, Romania – design and research activity

09/1984 – 09/1986: **Mechanical Engineer**, S.C. “Electroputere” SA, Craiova, Romania, Tools Factory – manufacturing process design activity

TEACHING EXPERIENCE

09.2017 – 12.2017: JHU, WSE, Mechanical Engineering Department:
- **EN.530.403, Engineering Design Project I** (part time)

02.2017 – 05.2017: JHU, WSE, Mechanical Engineering Department:
- **EN.530.404, Engineering Design Project II** (part time)

- 09.2016 – 12.2016: JHU, WSE, Mechanical Engineering Department:
- **EN.530.403, Engineering Design Project I** (part time)
- 02.2016 – 05.2016: JHU, WSE, Mechanical Engineering Department:
- **EN.530.404, Engineering Design Project II** (part time)
- 09.2015 – 12.2015: JHU, WSE, Mechanical Engineering Department:
- **EN.530.403, Engineering Design Project I** (part time)
- 02.2015 – 05.2015: JHU, WSE, Mechanical Engineering Department:
- **EN.530.404, Engineering Design Project II** (part time)
- 10.1998 – 03.2004: Associate Professor, School of Mechanical Engineering, University of Craiova, Romania:
- **Industrial Robots** – Course, Laboratory experiments;
- **Mechanical Structures for Robots and Manipulators** – Course, Laboratory experiments, Project, Seminar;
- **Machine Components Design** - Course, Laboratory experiments, Project;
- **Special Mechanisms and Mechanical Transmissions for Robots**
- Course, Laboratory experiments, Project, Seminar;
- **Machine Design Optimization** - Course, Project, Seminar (2002-2004, new course).
- 10/1993 – 09/1998: Senior Lecturer, School of Mechanical Engineering, University of Craiova, Romania:
- **Industrial Robots** – Course, Laboratory experiments (new course);
- **Mechanical Structures for Robots and Manipulators** – Course, Laboratory experiments, Project, Seminar (new course);
- **Machine Components Design** - Course, Laboratory experiments, Project;
- **Mechanisms and Machines Theory** - Course, Laboratory experiments, Project, Seminar;
- 09/1990 – 09/1993: Assistant Professor, School of Mechanical Engineering, University of Craiova, Romania:
- **Machine Components Design** – Laboratory experiments, Project, Seminar;
- **Mechanisms and Machines Theory** – Laboratory experiments, Project, Seminar;

AWARDS

2015: Best Paper Award, IEEE MFI 2015

2014: Best Medical Application Paper Award, IEEE Sensor 2014

- 2014: Best Student Paper Award (for student Berk Gonenc), IEEE Sensor 2014
 2014: Best Student Paper Award - Finalist (for student Xingchi He), IEEE ICRA 2014
 2014: Senior Member, IEEE
 2012: Best Poster Award, 2nd Place, CARS 2012
 2010: Best Poster Award, Hamlyn Symposium 2010

PUBLICATIONS

Books and Textbooks

- [B1] Popescu, I., Iordachita, I., Dumitru, N., Rinderu, P. *Biological Mechanisms*, SITECH Publishing House, Craiova, Romania, ISBN 973-97524-9-1, 1997, (in Romanian).
 [B2] Iordachita, I. *Special Mechanisms and Mechanical Transmissions for Industrial Robots*, University of Craiova, Publishing House, 1997, (in Romanian).
 [B3] Iordachita, I. *Industrial Robots*, University of Craiova, Publishing House, 1997, (in Romanian);
 [B4] Catrina, G., Dumitru, N., Ilie, E., Iordachita, I., Margine, A., Rosca, D. *Machine Parts. Practical Applications Guide*, University of Craiova, Publishing House, 1994, (in Romanian);

Journal Papers

- [J1] Gonenc, B., Chae, J., Gehlbach, P., Taylor, R.H., and Iordachita, I., "Towards Robot-Assisted Retinal Vein Cannulation: A Motorized Force-Sensing Microneedle Integrated with a Handheld Micromanipulator." *Sensors*. vol. 17, no.10. p. 2195 (25 pg.) Sep. 2017.
 [J2] Su, L., Iordachita, I., Zhang, Y., Lee, J., Ng, S.K., Jackson, J., Hooker, T., Wong, J., Herman, J.M., Sen, H.T. and Kazanzides, P., "Feasibility study of ultrasound imaging for stereotactic body radiation therapy with active breathing coordinator in pancreatic cancer." *Journal of Applied Clinical Medical Physics*. vol. 18, no. 4, pp.84-96, Jul. 2017.
 [J3] Alambeigi, F., Wang, Y., Sefati, S., Gao, C., Murphy, R.J., Iordachita, I., Taylor, R.H., Khanuja, H. and Armand, M., "A curved-drilling approach in core decompression of the femoral head osteonecrosis using a continuum manipulator." *IEEE Robotics and Automation Letters*, vol. 2, no. 3, pp.1480-1487, Jul. 2017
 [J4] Sen, H., Bell, M.L., Zhang, Y., Ding, K., Boctor, E., Wong, J., Iordachita, I. and Kazanzides, P., "System Integration and In-Vivo Testing of a Robot for Ultrasound Guidance and Monitoring during Radiotherapy." *IEEE Transactions on Biomedical Engineering*. vol. 64, no. 7, pp. 1608-1618, Jul. 2017.
 [J5] Channa, R., Iordachita, I., Handa, J.T., "Robotic Vitreoretinal Surgery." *RETINA*. . vol. 37, no. 7, pp.1220-1228, Jul. 2017.
 [J6] Gonenc, B., Chamani, A., Handa, J., Gehlbach, P., Taylor, R.H. and Iordachita, I., "3-DOF Force-Sensing Motorized Micro-Forceps for Robot-Assisted Vitreoretinal Surgery." *IEEE Sensors Journal*. vol. 17, no. 11, pp. 3526-3541, Jun. 2017
 [J7] Li, M., Li, G., Gonenc, B., Duan, X. and Iordachita, I., "Towards human-controlled, real-time shape sensing based flexible needle steering for MRI-guided percutaneous therapies." *The International Journal of Medical Robotics and Computer Assisted Surgery*. vol. 13, no. 2, e1762, (14 pg.), Jun. 2017.

- [J8] Marker, D.R., U-Thainual, P., Flammang, A.J., Fichtinger, G., Iordachita, I.I., Carrino, J.A. and Fritz, J., "1.5 T augmented reality navigated interventional MRI: paravertebral sympathetic plexus injections." *Diagnostic and Interventional Radiology*, vol. 23, no. 3, pp.227-232, May 2017.
- [J9] Su, H., Iordachita, I., Tokuda, J., Hata, N., Liu, X., Seifabadi, R., Xu, S., Wood, B., Fischer, G., "Fiber Optic Force Sensors for MRI-Guided Interventions and Rehabilitation: A Review." *IEEE Sensors Journal*. vol. 17, no. 7, pp.1952-1963, Apr. 2017.
- [J10] Aalamifar, F., Khurana, R., Cheng, A., Guo, X., Iordachita, I. and Boctor, E.M., "Enabling technologies for robot assisted ultrasound tomography." *The International Journal of Medical Robotics and Computer Assisted Surgery*. vol. 13, no. 1, pp.1-11, Mar. 2017.
- [J11] Gao, A., Murphy, R., Liu, H., Iordachita, I. and Armand, M., "Mechanical Model of Dexterous Continuum Manipulators with Compliant Joints and Tendon/External Force Interactions." *IEEE/ASME Transactions on Mechatronics*. vol. 22, no. 1, pp.465-475, Feb. 2017.
- [J12] Sen, H.T., Cheng, A., Ding, K., Boctor, E., Wong, J., Iordachita, I. and Kazanzides, P., "Cooperative Control with Ultrasound Guidance for Radiation Therapy," *Frontiers in Robotics and AI*, vol. 3, p.49, Sep. 2016.
- [J13] Seifabadi, R., Aalamifar, F., Iordachita, I., Fichtinger, G., "Toward Teleoperated Needle Steering under Continuous MRI Guidance for Prostate Percutaneous Interventions." *Int. J. Med. Robotics and Comput. Assist. Surg*, vol. 12, no. 3, pp. 355-369, Sep. 2016.
- [J14] Bell, M., Kumar, S., Kuo, L., Tutkun Sen, H., Iordachita, I., & Kazanzides, P., "Toward standardized acoustic radiation force-based ultrasound elasticity measurements with robotic force control." *IEEE Transactions on Biomedical Engineering*, vol. 63, no. 7, pp. 1517-1524, Jul. 2016.
- [J15] Eslami, S., Shang, W., Li, G., Patel, N., Fischer, G.S., Tokuda, J., Hata, N., Tempany, C.M., Iordachita, I., "In-Bore Prostate Transperineal Interventions with an MRI-guided Parallel Manipulator: System Development and Preliminary Evaluation." *Int. J. Med. Robotics and Comput. Assist. Surg*, vol. 12, no. 2, pp. 199-213, Jun. 2016.
- [J16] Yu, J., Zhang, B., Iordachita, I.I., Reyes, J., Lu, Z., Brock, M.V., Patterson, M.S., Wong, J.W. and Wang, K.K.H., "Systematic study of target localization for bioluminescence tomography guided radiation therapy." *Medical physics*, vol. 43, no. 5, pp.2619-2629, May 2016.
- [J17] Marker, D.R., U-Thainual, P., Ungi, T., Flammang, A., Fichtinger, G., Iordachita, I., Carrino, J.A., Fritz, J., "MR-guided Perineural Injection of the Ganglion Impar: Technical Considerations and Feasibility." *Skeletal Radiology*, vol. 45, no. 5, pp. 591-597, May, 2016.
- [J18] Zhang, B., Wang, K.K-H., Yu, J., Eslami, S., Iordachita, I., Reyes, J., Malek, R., Tran, P.T., Patterson, M.S., Wong, J.W., "Bioluminescence tomography guided radiation therapy for preclinical research," *International Journal of Radiation Oncology* Biology* Physics*, vol. 94, no. 5, pp. 1144-1153, Apr. 2016.
- [J19] Liu, H., Farvardin, A., Grupp, R., Murphy, R., Taylor, R.H., Iordachita, I., Armand, M., "Shape tracking of a dexterous continuum manipulator utilizing two large deflection shape sensors," *IEEE Sensor Journal*, vol. 15, no. 10, pp. 5494-5503, Oct.2015.
- [J20] Yang, Y., Armour, M., Wang, K., Gandhi, N., Iordachita, I., Siewerdsen, J., Wong, J., "Evaluation of a cone beam computed tomography geometry for image guided small animal irradiation," *Physics in Medicine and Biology*, vol. 60, no. 13, pp. 5163-5177, Jun. 2015.
- [J21] Yang, Y., Wang, K.K-H., Eslami, S., Iordachita, I., Naser, M., Patterson, M.S., and Wong, J.W., "Systematic calibration of an integrated x-ray and optical tomography system for preclinical radiation research" *Med. Phys.*, vol. 42, no. 4, pp. 1710-1720, Apr. 2015.
- [J22] Fritz, J., U-Thainual, P., Ungi, T., Flammang, A.J., Kathuria, S., Fichtinger, G., Iordachita,

- I., Carrino, J.A., "MR-Guided Vertebroplasty with Augmented Reality Image Navigation," *Cardiovasc. Intervent. Radiol.* vol. 37, no. 5, pp. 1589-1596, Dec. 2014.
- [J23] Lediju Bell, M.A., Sen, H.T., Iordachita, I., Kazanzides, P., Wong, J., "In vivo reproducibility of robotic probe placement for an novel ultrasound-guided radiation therapy system," *Journal of Medical Imaging*, vol. 1, no. 2, p. 025001, Jul.– Sep. 2014.
- [J24] Gurbani, S., Wilkening, P., Zhao, M., Gonenc, B., Cheon, G.W., Iordachita, I., Chien, W.W., Taylor, R.H., Niparko, J., Kang, J.U., "Robot-assisted three-dimensional registration for cochlear implant surgery using a common path swept-source optical coherence tomography probe," *Journal of Biomedical Optics*, vol. 19, no. 5, p. 057004, May 2014.
- [J25] He, X., Handa, J., Gehlbach, P., Taylor, R., Iordachita, I., "A Sub-Millimetric 3DOF Force Sensing Instrument with Integrated Fiber Bragg Grating for Retinal Microsurgery," *IEEE Transaction on Biomedical Engineering*, vol. 61, no. 2, pp. 522-534, Feb. 2014.
- [J26] Seifabadi, R., Cho, N.B., Song, S.E., Tokuda, J., Hata, N., Tempny, C.M., Fichtinger, G., Iordachita, I., "Accuracy Study of a Robotic System for MRI-guided Prostate Needle Placement," *Int. J. Med. Robot.*, vol. 9, no. 3, pp. 305-316, Sep. 2013.
- [J27] Fritz, J., U-Thainual, P., Ungi, T., Flammang, A.J., McCarthy, E., Fichtinger, G., Iordachita, I., Carrino, J.A., "Augmented Reality Visualization using Image Overlay Technology for MR-Guided Interventions: Cadaveric Bone Biopsy at 1.5 Tesla," *Invest. Radiol.*, vol. 48, no. 6, pp. 464-470, Jun. 2013.
- [J28] Song, S.E., Hata, N., Iordachita, I., Fichtinger, G., Tempny, C.M., Tokuda, J. A., "Workspace-oriented Needle Guiding Robot for 3T MRI-guided Transperineal Prostate Intervention: Evaluation of In-bore Workspace and MRI Compatibility," *Int. J. Med. Robot.*, vol. 9, no. 1, pp. 67-74, Mar. 2013.
- [J29] Tuli, R., Armour, M., Surmak, A., Reyes, J., Iordachita, I., Patterson, M., Wong, J., "Accuracy of Off-Line Bioluminescence Imaging to Localize Targets in Preclinical Radiation Research," *Radiation Research*, vol. 179, no. 4, pp. 416-421, Apr. 2013.
- [J30] Cutler, N., Balicki, M., Finkelstein, M., Wang, J., Gehlbach, P., McGready, J., Iordachita, I., Taylor, R., Handa, J. T., "Auditory Force Feedback Substitution Improves Surgical Precision during Simulated Ophthalmic Surgery," *Invest. Ophthalmol. Vis. Sci.*, vol. 54, no. 2, pp. 1316-1324, Feb. 2013.
- [J31] Krieger, A., Song, S.E., Cho, N.B., Iordachita, I.I., Guion, P., Fichtinger, G., Whitcomb, L.L., "Development and Evaluation of an Actuated MRI-Compatible Robotic System for MRI-Guided Prostate Intervention," *IEEE ASME Trans. Mechatron.*, vol. 18, no. 1, pp. 273-284, Feb. 2013.
- [J32] U-Thainual, P., Fritz, J., Moonjaita, C., Ungi, T., Flammang, A.J., Carrino, J.A., Fichtinger, G., Iordachita, I.I., "MR Image Overlay Guidance: System Evaluation for Pre-clinical use," *Int. J. Comput. Assist. Radiol. Surg.*, vol. 33, no. 1, pp. 200-206, Jan. 2013.
- [J33] Sunshine, S., Balicki, M., He, X., Olds, K., Kang, J.U., Gehlbach, P., Taylor, R.H., Iordachita, I., Handa, J.T., "A Force-sensing Microsurgical Instrument That Detects Forces Below Human Tactile Sensation," *Retina*, vol. 33, no. 1, pp. 200-206, Jan. 2013.
- [J34] Fritz, J., U-Thainual, P., Ungi, T., Flammang, A.J., Fichtinger, G., Iordachita, I.I., Carrino, J.A., "Augmented reality visualization using an image overlay system for MR-guided interventions: technical performance of spine injection procedures in human cadavers at 1.5 Tesla," *Eur. Radiol.*, vol. 23, no. 1, pp. 235-245, Jan. 2013.
- [J35] Tokuda, J., Song, S.E., Fischer, G.S., Iordachita, I., Seifabadi, R., Cho, N.B., Tuncali, K., Fichtinger, G., Tempny, C.M., Hata, N., "Preclinical evaluation of MRI-compatible pneumatic robot for angulated needle placement in prostate interventions," *Int. J. Comput. Assist. Radiol. Surg.*, vol. 7, no. 6, pp. 949-957, Nov. 2012.
- [J36] Fritz, J., U-Thainual, P., Ungi, T., Flammang, A.J., Fichtinger, G., Iordachita, I.I., Carrino, J.A., "Augmented Reality Visualization with Use of Image Overlay Technology for MR

- Imaging-guided Interventions: Assessment of Performance in Cadaveric Shoulder and Hip Arthrography at 1.5 T,” *Radiology*, vol. 265, no. 1, pp. 254-259, Oct. 2012.
- [J37] Tokuda, J., Tuncali, K., Iordachita, I., Song, S.E., Fedorov, A., Oguro, S., Lasso, A., Fennessy, F.M., Tempany, C.M., Hata, N., “In-bore setup and Software for 3T MRI-guided Transperineal Prostate Biopsy,” *Phys. Med. Biol.* vol. 57, no. 18, pp. 5823-5840, Sep. 2012.
- [J38] Song, S.E., Cho, N.B., Iordachita, I., Guion, P., Fichtinger, G., Kaushal, A., Camphausen, K., Whitcomb, L.L., “Biopsy Needle Artifact Localization in MRI-Guided Robotic Transrectal Prostate Intervention,” *IEEE Trans. Biomed. Eng.*, vol. 59, no. 7, pp. 1902-1911, Jul. 2012.
- [J39] Liu, X., Iordachita, I.I., He, X., Taylor, R.H., Kang, J.U., “Miniature fiber-optic force sensor for vitreoretinal microsurgery based on low-coherence Fabry-Perot interferometry,” *Biomed. Opt. Express.*, vol. 3, no. 5, pp. 1062-1076, May 2012.
- [J40] Jain, A., Deguet, A., Iordachita, I., Chintalapani, G., Vikal, S., Blevins, J., Le, Y., Armour, E., Burdette, C., Song, D., Fichtinger, G., “Intra-operative 3D Guidance and Edema Detection in Prostate Brachytherapy using a non-isocentric C-arm,” *Med. Image Anal.*, vol. 16, no. 3, pp. 731-743, Apr. 2012.
- [J41] Seifabadi, R., Song, S.E., Krieger, A., Cho, N.B., Tokuda, J., Fichtinger, G., Iordachita, I., “Robotic system for MRI-guided prostate biopsy: feasibility of teleoperated needle insertion and ex vivo phantom study,” *Int. J. Comput. Assist. Radiol. Surg.*, vol. 7, no. 2, pp. 181-190, Mar. 2012.
- [J42] Fritz, J., U-Thainual, P., Ungi, T., Flammang, A.J., Cho, N.B, Fichtinger, G., Iordachita, I.I., Carrino, J.A., “Augmented Reality Visualization with Image-Overlay for MR-Guided Interventions: Accuracy for Lumbar Spinal Procedures with a 1.5-Tesla MRI System,” *Am. J. Roentgenol.*, vol. 198, no. 3, pp. W266-W273, Mar. 2012.
- [J43] Krieger, A., Iordachita, I., Guion, P., Singh, A.K., Kaushal, A., Ménard, C., Pinto, P.A., Camphausen, K., Fichtinger, G., Whitcomb, L.L., “An MRI-Compatible Robotic System with Hybrid Tracking for MRI-Guided Prostate Intervention,” *IEEE Trans. Biomed. Eng.*, vol. 58, no. 11, pp. 3049-3060, Nov. 2011.
- [J44] Song, D.Y., Burdette, E.C., Fiene, J., Armour, E., Kronreif, G., Deguet, A., Zhang, Z., Iordachita, I., Fichtinger, G., Kazanzides, P., “Robotic needle guide for prostate brachytherapy: Clinical testing of feasibility and performance,” *Brachytherapy*, vol. 10, no. 1, pp. 57-63, Jan.-Feb. 2011.
- [J45] Armour, M., Ford, E., Iordachita, I., Wong, J., “CT Guidance is Needed to Achieve Reproductive Positioning of the Mouse Head for Repeat Precision Cranial Irradiation,” *Radiat. Res.*, vol. 173, no. 1, pp. 119-123, Jan. 2010.
- [J46] Vikal, S., U-Thainual, P., Carrino, J., Iordachita, I., Fisher, G., Fichtinger, G., “Perk Station – Percutaneous Surgery Training and Performance Measurement Platform,” *Comput. Med. Imaging Graph.*, vol. 34 no. 1, pp. 19-32, Jan. 2010.
- [J47] Tryggestad, E., Armour, M., Iordachita, I., Verhaegen, F., Wong, J.W., “A Comprehensive System for Dosimetric Commissioning and Monte Carlo Validation for the Small Animal Radiation Research Platform,” *Phys. Med. Biol.*, vol. 54, no. 17, pp. 5341-5357, Sep. 2009.
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- [J49] Matinfar, M., Ford, E., Iordachita, I., Wong, J., Kazanzides, P., “Image-guided Small Animal Radiation Research Platform: Calibration of Treatment Beam Alignment,” *Phys. Med. Biol.*, vol. 54, no. 4, pp. 891-905, Feb. 2009.
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- Brachytherapy," *Med. Image Anal.*, vol. 12, no. 5, pp. 535-545, Oct. 2008.
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- [J52] Fischer, G.S., Iordachita, I., Csoma C., Tokuda, J., DiMaio, S.P., Tempany, C.M., Hata, N., Fichtinger, G., "MRI-Compatible Pneumatic Robot for Transperineal Prostate Needle Placement," *IEEE ASME Trans. Mechatron.*, vol. 13, no. 3, pp. 295-305, Jun. 2008.
- [J53] Kazanzides, P., Chang, J., Iordachita, I., Li, J., Ling, C.C., Fichtinger, G., "Development of an image-guided robot for small animal research," *Comput. Aided Surg.*, vol. 12, no. 6, pp. 357-365, Nov. 2007.
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- [J57] Iordachita, I., Catrina, G., "Considerations over the Industrial Robots Precision," *Annals of the University of Craiova, Mechanical Engineering Series (ISSN1223-5296)*, vol. 2001, no. 1, pp. 137-142, 2001. (in Romanian)
- [J58] Catrina, G., Iordachita, I., "Kinematics Errors of a TRTRR Robot," *Annals of the University of Craiova, Mechanical Engineering Series (ISSN1223-5296)*, vol. 2001, no. 1, pp. 366-371, 2001. (in Romanian)
- [J59] Iordachita, I., Tudor, M., "Contributions to Modeling of Bio-mechanisms that Ensure the Reptiles Locomotion," *Annals of the University of Craiova, Mechanical Engineering Series (ISSN1223-5296)*, vol. 1999, no. 1, pp. 120-123, 1999. (in Romanian)
- [J60] Iordachita, I., "Aspects Regarding the Dragging Locomotion Kinematics," *TCMM (ISBN 973-31-1091-4, ISBN 973-31-1094-9)*, vol. 29, no. 1, pp. 281-284, 1998. (in Romanian)
- [J61] Iordachita, I., "Experimental Research Regarding Mechanisms for Dragging Locomotion," *TCMM (ISBN 973-31-1091-4, ISBN 973-31-1094-9)*, vol. 29, no. 1, pp. 273-280, 1998. (in Romanian)
- [J62] Iordachita, I., "Contributions to the Inverse-Kinematic of Mechanisms that Provide Dragging Locomotion," *Annals of the Constantin Brancusi University*, vol. 4, no. B, pp. 477-482, 1997. (in Romanian)
- [J63] Iordachita, I., "Contributions to the Structure of Locomotion Dragging Mechanisms," *Annals of the Constantin Brancusi University*, vol. 4, no. B, pp. 471-476, 1997. (in Romanian)
- [J64] Iordachita, I., Cretu, S., "Control Functions for Mechanisms Assuring the Dragging Locomotion Heaving Translation Joints," *Annals of the University of Craiova, Mechanical Engineering Series (ISSN1223-5296)*, vol. 1995, no. 1, pp. 108-111, 1995. (in Romanian)
- [J65] Iordachita, I., "Considerations over the Median Line Expression in the Case of Mechanisms that Provide Crawling Locomotion," *Annals of the University of Craiova, Mechanical Engineering Series (ISSN1223-5296)*, vol. 1995, no. 1, pp. 105-107, 1995. (in Romanian)
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- [J67] Iordachita, I., Dumitru, N., "Le modele mecanique du deplacement des annelides," *Scientific*

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Patents and Inventions

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Other Papers

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- [O3] Fischer, G.S., Iordachita, I., U-Thainual, P., Carrino, J.A., Fichtinger, G., "A Training Suite for Image Overlay and other Needle Insertion Techniques," *2008 MICCAI Workshop - Augmented Environments for Medical Imaging and Computer-Aided Surgery (AMI-ARCS), Sep. 2008.*
- [O4] Krieger, A., Guion, P., Csoma, C., Iordachita, I., Singh, A.K., Kaushal, A., Whitcomb, L.L., Fichtinger, G., "MRI Guided Prostate Biopsy and Marker Placements," *Workshop on Clinical Image-Guided Therapy: Opportunities and Needs, Rockville, Maryland, Mar. 2008.*
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- [O6] Fichtinger, G, Fiene, J., Kennedy, C., Iordachita, I., Kronreif, G., Song, D.Y., Burdette, E.C., Kazanzides, P., "Robotic Assistance for Ultrasound Guided Prostate Brachytherapy," *Workshop on Clinical Image-Guided Therapy: Opportunities and Needs, Rockville, Maryland, Mar. 2008.*
- [O7] Fichtinger, G, Fiene, J., Kennedy, C., Iordachita, I., Kronreif, G., Song, D.Y., Burdette, E.C., Kazanzides, P., "Robotic Assistance for Ultrasound Guided Prostate Brachytherapy," *The Fourth AdMeTech Foundation Conference: Ending the Era of Blind Cancer Care & Creating a Future of Image-Guided, Minimally Invasive Diagnosis & Treatment. Washington, DC, Sep. 2007.*
- [O8] Catrina, G., Iordachita, I., Margine, A., "The Linear Trajectory Precision for Industrial Robots," *Third International Conference on Electro-mechanic and Energetic Systems (SIELMEN-2001), ISBN 9975-9638-8-9, Chisinau, Moldova, Vol. III, pp. 207-210, 2001.*
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- [O11] Iordachita, I., "Considerations over the Mechanisms that Provide Snake-like Locomotion," *The 2nd National Workshop on Mobile Robots (WMRC-2001), Craiova, Romania, ISBN 973-8043-39-5, 2001. (in Romanian)*

- [O12] Tudor, M., Iordachita, I., "Studies on the Bio-mechanisms for Walking with Creeping Locomotion with Applicability of Mobile Robots," *The 2nd National Workshop on Mobile Robots (WMRC-2001)*, Craiova, Romania, ISBN 973-8043-39-5, 2001. (in Romanian)
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- [O18] Georgescu, S., Iordachita, I., "Software Package for the Masses Calculus of Tubes Presenting Ribs," *National Symposium PRASIC'94*, Brasov, Romania, pp. ,61-68, 1994 (in Romanian)
- [O19] Iordachita, I., "About the Structure of Locomotion Dragging Mechanisms," *3rd National Conference of Technologies and Numerical Drawing Methods in Engineering*, Craiova, Romania, vol. II, pp. 258-265, 1994. (in Romanian)
- [O20] Iordachita, I., Dumitru, N., "Locomotion Systems for Digging Tunnel Machine based on Bionics Principles," *VI-th National Symposium on MTM*. Timisoara, Romania, vol. 1, MTM paper #41, 1992. (in Romanian)
- [O21] Dumitru, N., Iordachita, I., "Algorithm for Gearing Mechanisms Study," *VI-th National Symposium on MTM*, Timisoara, Romania, vol. 2 MTM, paper #32, 1992. (in Romanian)
- [O22] Catrina, G., Radulescu, M., Iordachita, I., Margine, A., Bogdan, R., "Stand for testing of Differential Transmissions Screw-nut," *VI-th National Symposium on MTM*, Timisoara, Romania, vol. 2 MTM, paper #47, 1992. (in Romanian)
- [O23] Iordachita, I., Sabau, A., "Working Space Volume Calculus for the RD5NT Robot using the Monte Carlo Method," *Proceedings of the Scientific Communications "Conception, Technology and Management in Engineering,"* Iasi, Romania, pp.123-128, 1992. (in Romanian)

PRESENTATIONS

Conferences and Workshops (excluding paper presentations)

- [T1] "Optimized Manipulator for in-bore MRI-guided Transperineal Prostate Biopsy," invited talk to *Workshop on Robotics Microsurgery and Image-Guided Surgical Interventions*, IEEE BioRob 2014, SaoPaulo, Brazil, August 12th, 2014.
- [T2] "Robot-assisted retinal microsurgery: current challenges and future perspectives," 16th EURETINA Congress, Bella Center, Copenhagen, Denmark, September 11th 2016
- [T3] "Optical Fiber-based Sensorized Instruments for Robot-Assisted Surgery," invited talk to *Workshop on Current and Future Chalanges in Robotics Research for Biomedical Applications*, IEEE EMBC 2017, Jeju Island, South Korea, July 11th , 2017.

- [T4] “Fundamentals of Engineering to Understand Robotic Surgery,” 17th EURETINA Congress, CCIB, Barcelona, Spain, September 9th 2017
- [T5] “Dexterous Continuum Manipulators for Robot-Assisted Surgery,” invited talk to *Workshop on Continuum Robots in Medicine – Design, Integration, and Applications*, IEEE IROS 2017, Vancouver, Canada, September 24th, 2017
- [T6] “Safe Tissue Manipulation in Retinal Microsurgery via Motorized Instruments with Force Sensing,” invited talk to *Focused Session – Sensor for Medical Robotics*, IEEE SENSORS 2017, Glasgow, Scotland, UK, October 31st, 2017

Invited University Colloquia and Seminars

- [T7] “Robot-assisted retinal microsurgery: current challenges and future perspectives,” Worcester Polytechnic Institute, December 5th 2014.
- [T8] “Optical Fiber-based Sensorized Instruments for Robot-Assisted Surgery,” SPL, Brigham and Women’s Hospital, Boston, MA, USA, March 23rd, 2016

RESEARCH FUNDING AND SUPPORT

Current:

1. Title: Enabling Technology for Safe Robot-assisted Surgical Micromanipulation
Dates: 3/15/2017-3/14/2020
Grantor: National Institutes of Health
Grant #: 1R01EB023943-01 (Iordachita)
Institution: Johns Hopkins University
Amount: \$305,007/Y1
Summary: The goal is to develop a cooperatively controlled robotic system with enhanced sensorimotor capabilities that in conjunction with multifunction force-sensing microsurgical instruments could enable safe robot-assisted retinal surgery.
Role: Principal Investigator
2. Title: MRI Compatible body-mounted robot to streamline pediatric shoulder arthrography.
Dates: 9/15/2016-6/30/2020
Grantor: National Institutes of Health
Grant #: 1R01 EB020003-01 (Cleary)
Institution: Children’s national Medical Center, subcontract Johns Hopkins University
Amount: \$525,113/2016
Summary: Develop and test a new patient-mounted MRI-compatible shoulder arthrography robot for needle guidance in pediatric interventional procedures.
Role: Principal Investigator (of Johns Hopkins University sub-contract)
3. Title: An Active Handheld Micromanipulator.
Dates: 8/01/2015-7/31/2018
Grantor: National Institutes of Health
Grant #: 2R01 EB000526-07 (Riviere)
Institution: Carnegie Mellon University, subcontract Johns Hopkins University
Amount: \$354,825/2016
Summary: Develop and test a new handheld micromanipulator that performs active tremor compensation in microsurgery.
Role: Principal Investigator (of Johns Hopkins University sub-contract)

4. Title: Objective assessment of surgical competence in a septoplasty model.
Dates: 7/01/2015-6/30/2020
Grantor: National Institutes of Health
Grant #: R01DE025265 (Ishii)
Institution: Johns Hopkins University
Amount: \$582,025/2016
Summary: Our project aims to provide educators with an integrated objective skills assessment platform and tools for objective determination of competency, which can be readily deployed across graduate surgical training programs in the country.
Role: co-Investigator

Completed:

5. Title: Enabling technology for MRI-guided prostate interventions
Dates: 9/12/2011-7/31/2016
Grantor: National Institutes of Health
Grant #: 2R01CA111288-06 (Tempany)
Institution: Brigham and Women's Hospital, subcontract Johns Hopkins University
Amount: \$ 4,090,575
Summary: Develop technology for transrectal needle based biopsy and local therapy of prostate cancer in conventional closed MRI scanner.
Role: Principal Investigator (of Johns Hopkins University sub-contract)
6. Title: An integrated x-ray/optical tomography system for preclinical radiation research.
Dates: 7/01/2011-6/30/2015
Grantor: National Institutes of Health
Grant #: R01 CA158100-01 (Wong)
Institution: Johns Hopkins Medical Institutions, subcontract Johns Hopkins University
Amount: \$1,682,750
Summary: The goal is to develop an integrated x-ray/bioluminescence tomography system that can function as a standalone imaging research system and also dock to the SARRP to guide focal irradiation.
Role: Principal Investigator (of Johns Hopkins University sub-contract)
7. Title: Integrated 3D X-Ray/ultrasound guided radiation therapy of soft tissue targets
Dates: 10/15/2011-9/31/2015
Grantor: National Institutes of Health
Grant #: 1R01CA161613-01 (Wong)
Institution: Johns Hopkins Medical Institutions
Amount: \$1,559,926
Summary: The goal is to develop an integrated x-ray/ultrasound tomography system on board a medical accelerator to ensure accurate irradiation of abdominal targets that have been difficult to localize with x-ray CT alone.
Role: co-Investigator
8. Title: An Active Handheld Micromanipulator.
Dates: 2/1/2011 – 1/31/2015
Grantor: National Institutes of Health
Grant #: 1 R01 EB000526-04A1 (Riviere)
Institution: Carnegie Mellon University, subcontract Johns Hopkins University
Amount: \$988,130
Summary: Develop and test a new handheld micromanipulator that performs active tremor compensation in microsurgery.

- Role: Principal Investigator (of Johns Hopkins University sub-contract)
9. Title: A Microsurgical Assistant System.
Dates: 8/1/2008 – 6/31/2014
Grantor: National Institutes of Health
Grant #: 1 R01 EB 007969-01 A1 (Taylor)
Institution: Johns Hopkins University
Amount: \$5,885,314
Summary: Develop technology and systems addressing fundamental limitations in current microsurgical practice, using vitreoretinal surgery as the initial focus. This includes development of a "surgical workstation" that is interfaced to a stereo visualization subsystem and a family of novel sensors, instruments, and robotic devices.
Role: co-Investigator
10. Title: OCT Imaging and Assistive Systems for Cochlear Implant Surgery
Dates: 2/01/2012 – 4/31/2014
Grantor: Cochlear Corporation
Grant #: 1 (Taylor)
Institution: Johns Hopkins University
Amount: \$ 238,000
Summary: Develop the technology for imaging the cochlea canal and assisting cochlea implant insertion
Role: co-Investigator
11. Title: Calibration and Commissioning of a Small Animal Radiation Research Platform (SARRP) for Pre-clinical Research
Dates: 09/01/09 – 08/31/12
Grantor: Gulmay Medical Ltd
Grant #: 1 (Wong)
Institution: Johns Hopkins Medical Institutions
Amount: \$100,000
Summary: The goals are to provide continue technical support and to transfer the know-how from Hopkins to Gulmay in their commercialization of the first generation Small Animal Radiation Research Platform
Role: co-Investigator
12. Title: Engineering Research Center for Computer-Integrated Surgical Systems and Technology.
Dates: 9/1/1997-5/31/2010
Grantor: National Science Foundation
Grant #: EEC 9731748 (Taylor)
Institution: Johns Hopkins University
Amount: \$30,000,000 (for 10 years)
Summary: The CISST ERC is a multi-institutional, multidisciplinary center whose focus is of basic science, computer-based technology, and engineered systems working cooperatively with surgeons to significantly change the way surgical procedures are carried out in the 21st century. Significant research focuses include modeling and analysis for treatment planning and control, robotics and human interfaces and systems for minimally-invasive, image-guided percutaneous therapy and microsurgery.
Role: Senior Research Staff
13. Title: R01: Transrectal Prostate Therapy Robot in Closed MRI Scanner
Dates: 9/2003 – 7/31/2009
Grantor: National Institutes of Health,
Grant #: 1 R01 EB002963-01 (Whitcomb)
Institution: Johns Hopkins University

- Amount: \$2,030,342
 Summary: The major goal of this project is to design and develop a robot assisted system for transrectal needle placement inside closed MRI magnets for prostate interventions.
 Role: Senior Research Staff
14. Title: Enabling technology for MRI-guided prostate interventions
 Dates: 6/1/2006 – 5/31/2011
 Grantor: National Institutes of Health,
 Grant #: R01CA111288-01 (C. Tempany)
 Institution: Brigham and Women's Hospital, Subcontract Johns Hopkins University
 Amount: \$220,000 (Johns Hopkins University)
 Summary: Develop technology for transrectal needle based biopsy and local therapy of prostate cancer in conventional closed MRI scanner.
 Role: Senior Research Staff
15. Title: Image Overlay for MRI-Guided Needle Insertion
 Dates: 7/01/2007 – 6/30/2009
 Grantor: National Institutes of Health
 Grant #: R01 CA118371 (Carrino)
 Institution: Johns Hopkins University
 Amount: \$300,000
 Summary: The goal of this project is to make diagnostic closed high-field MRI scanners available for guiding needle placement with 2D Image Overlay technique.
 Role: Senior Research Staff
16. Title: An Image Guided Small Animal Radiation Research Platform
 Dates: 4/1/2005 – 3/31/2008
 Grantor: National Institutes of Health
 Grant #: 1 RO1 CA108449-01 (Wong)
 Institution: Johns Hopkins University
 Amount: \$253,553 (3 year total)
 Summary: The goal of this project is to develop and test an image guided small animal radiation research platform (SARRP) that will accurately deliver complex ionizing radiation dose distributions in small animal tumor model systems (mice, rats and rabbits).
 Role: Senior Research Staff
17. Title: C-arm Fluoroscopy in Prostate Brachytherapy
 Dates: 4/1/2005 – 3/31/2008
 Grantor: National Institutes of Health
 Grant #: 2R44CA099374-02 (Burdette),
 Institution: Johns Hopkins University
 Amount: \$253,000 (Johns Hopkins University)
 Summary: Utilize C-arm fluoroscopy to determine seed locations in prostatic implants and register them to ultrasound space, to provide intra-operative implant optimization
 Role: Senior Research Staff
18. Title: Ultrasound Ablation of Bone Cancer with CT Fluoroscopy Guidance
 Dates: 9/21/2005 – 9/31/2007
 Grantor: National Institutes of Health
 Grant #: 1R43CA112852-01 (Burdette)
 Institution: Johns Hopkins University
 Amount: \$22,000 (Johns Hopkins University)
 Summary: Develop a system for interstitial ultrasound ablation of metastatic bone cancer
 Role: Senior Research Staff
- 19 Title: Robotic Needle Placement and Injection in Rodents

- Dates: 9/10/2003 – 08/31/2005
Grantor: National Institutes of Health
Grant #: R01 CA84596
Institution: Memorial Sloan Kettering Cancer Center
Amount: \$167,000 (Johns Hopkins University)
Summary: This is a subcontract from Memorial Sloan Kettering Cancer Center to develop an image-guided robot system for small animal research. Specifically, the robot is used to insert a measurement probe into anatomic targets that are identified in a preoperative PET image.
Role: Senior Research Staff
20. Title: Image Overlay for MRI-Guided Needle Insertions
Dates: 10/01/2002 – 9/30/2006
Grantor: National Institutes of Health
Grant #: R01 CA118371
Institution: Siemens Corporate Research
Amount: \$219,000 (Johns Hopkins University)
Summary: The goal of this project is make diagnostic closed high-field MRI scanners available for guiding needle placement with 2D Image Overlay technique
Role: Senior Research Staff
21. Title: Studies on Surgical Robotics
Dates: 10/01/2002 – 09/31/2003
Grantor: Japan Society for the Promotion of Science, a Japanese Government agency
Institution: Graduate School of Frontier Science, the University of Tokyo, JAPAN
Amount: \$68,000
Summary: The goal of this project is to develop new robotic devices for medical applications.
Role: co-Investigator
22. Title: Studies on Biologically Inspired Mechanisms for Locomotion
Dates: 06/1993 – 09/1997
Grantor: Ministry of Education/Ministry of Research and Youth, Romania
Grant #: 5006/1993, 468C/1994, 798B/1995, 663/1996, 663/1997
Institution: University of Craiova, Romania
Summary: The goal of this project is to evaluate the possibility of developing new mechanisms for robots' locomotion based on animals' locomotion.
Role: co-Investigator
23. Title: Speed Transducers for Locomotives
Dates: 1988 – 1989
Grantor: SC "Electroputere" SA, Craiova, Romania
Grant #: 2601
Institution: ICSIT-MTAE Craiova, Romania
Role: Project manager
24. Title: Electrical Locomotive for 5000-6000 kW with Thyristors EB-01
Dates: 1988 – 1989
Grantor: SC "Electroputere" SA, Craiova, Romania
Grant #: 2559
Institution: ICSIT-MTAE Craiova, Romania
Role: Research Staff
25. Title: Transformation of Electrical Diesel Locomotive 4000 CP in Electrical Locomotive with Diodes 2900 kW
Dates: 1988 – 1989
Grantor: SC "Electroputere" SA, Craiova, Romania

- Grant #: 4119
 Institution: ICSIT-MTAE Craiova, Romania
 Role: Research Staff
26. Title: Electrical Shunting Diesel Locomotive type 623-BS2
 Dates: 1987 – 1988
 Grantor: SC “Electroputere” SA, Craiova, Romania
 Grant #: 4114
 Institution: ICSIT-MTAE Craiova, Romania
 Role: Research Staff
27. Title: Electrical Shunting Locomotive LEM-1200 kW
 Dates: 1986 – 1989
 Grantor: SC “Electroputere” SA, Craiova, Romania
 Grant #: 4105
 Institution: ICSIT-MTAE Craiova, Romania
 Role: Research Staff
28. Title: Electrical Diesel Locomotive 3000 CP ca-ca
 Dates: 1985 – 1986
 Grantor: SC “Electroputere” SA, Craiova, Romania
 Grant #: 4106
 Institution: ICSIT-MTAE Craiova, Romania
 Role: Research Staff
29. Title: Electrical Locomotive for 3000-4000 kW (Bo-Bo) type Erc 438 CL1
 Dates: 1985 – 1986
 Grantor: SC “Electroputere” SA, Craiova, Romania
 Grant #: 4102
 Institution: ICSIT-MTAE Craiova, Romania
 Role: Research Staff
30. Title: Electrical Diesel Locomotive, Tropical Climate, DE 626 BL2 and DE 633 BL2
 Dates: 1984 – 1986
 Grantor: SC “Electroputere” SA, Craiova, Romania
 Grant #: 4103
 Institution: ICSIT-MTAE Craiova, Romania
 Role: Research Staff

PROFESIONAL ORGANIZATIONS AND SERVICE

Member

- Romanian Association for Machines and Mechanisms Theory 1992- present
- Romanian Society for Robotics (SRR) 1996 - present
- Institute of Electrical and Electronics Engineers (IEEE, SM14) 2008 - present
- America Society of Mechanical Engineers (ASME) 2010 - present

Editor

Journals

- International Journal of Medical Robotics Research: Associate Editor, 2015, 2016
- IEEE Robotics and Automation Letters (RA-L): Associate Editor, 2015, 2016, 2017
- MDPI Sensors: Guest Editor, 2017

Reviewer

Grant Proposal Peer Reviews

- National Science Foundation, USA: 2014
- European Research Council, Frontier Research Grants, 2016

Journals

- International Journal of Robotics Research: 2011, 2013; 2014; 2015, 2017
- IEEE Transactions on Robotics: 2011, 2012, 2015;
- IEEE Transactions on Mechatronics: 2015; 2016, 2017
- Robotica: 2008, 2011; 2015
- International Journal of Computer Assisted Radiology and Surgery: 2009, 2011; 2016, 2017
- International Journal of Medical Robotics and Computer Assisted Surgery: 2011, 2012, 2013; 2015, 2016, 2017
- Transactions on Biomedical Engineering: 2010, 2012; 2016, 2017
- Sensors & Actuators: A. Physical: 2012;
- Investigative Ophthalmology & Visual Science: 2009, 2010;
- Physics in Medicine and Biology: 2010;

Conferences

- IEEE International Conference on Robotics and Automation: 2011, 2012, 2013, 2014, 2015, 2016, 2017
- IEEE International Conference on Intelligent Robots and Systems: 2011; 2014; 2015, 2017
- IEEE EMBS International Conference: 2010, 2011, 2012, 2013; 2014; 2015, 2016, 2017
- IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics: 2010, 2012, 2014,

Service

- WSE Machine Shop Advising Committee 2011 - present
- ERC/LCSR Safety Committee 2005 - present

CONTACT INFORMATION

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