

## Steve Majerus, MSc, PhD

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### POSITIONS

<b>Research Scientist</b> APT Rehabilitation R&D Center, Louis Stokes Cleveland VA Medical Center, Cleveland, OH	<b>2014 – Present</b>
<b>Research Fellow</b> Nephrology Service, Louis Stokes Cleveland VA Medical Center, Cleveland, OH	<b>2019 – Present</b>
<b>Research Contractor</b> Dept of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic, Cleveland, OH	<b>2017 – Present</b>
<b>Biomedical Engineer</b> APT Rehabilitation R&D Center, Louis Stokes Cleveland VA Medical Center, Cleveland, OH	<b>2007 – 2014</b>
<b>Senior Research Associate (Post-Doc)</b> Dept of Electrical Engineering and Computer Science, Case Western Reserve University	<b>2014 – 2016</b>
<b>Mixed-Signal ASIC Designer</b> BluBerry, LLC, Columbia Station, OH	<b>2012 – 2015</b>
<b>Mixed-Signal ASIC Designer</b> Scientific Monitoring, Inc., Scottsdale, AZ	<b>2009 – 2012</b>

### RESEARCH INTERESTS

Electrical and ultrasonic neuromodulation; wireless bladder pressure monitoring; flexible, implantable nanocomposite sensors; biomedical signal processing and machine learning, application-specific integrated circuits

### AWARDED GRANTS

(LAST 5 YEARS ONLY)

VA RR&D Merit Review Principal Investigator	<i>Triggered Sacral Neuromodulation to Treat Neurogenic Bladder ... Pressure Data</i> <u>\$887,953</u> 2021
Industry Collaboration Co-Principal Investigator	<i>Estimation of Detrusor Pressure from a Single Catheter ... Measurement System</i> <u>\$185,709</u> 2021
NSF CPS / NIH NIBIB Co-Investigator	<i>Functional Feedback Methods for Wearable Focused Ultrasound Therapy</i> <u>\$331,142</u> 2021
VA iNET Seed Principal Investigator	<i>Point of Care Ultrasound to Determine Thrombosis Risk in Hemodialysis</i> <u>\$38,713</u> 2021
VA RR&D SPiRE Principal Investigator	<i>Toward Wearable Ultrasonic Neurostimulation ... Urinary Urge Incontinence</i> <u>\$200,346</u> 2020
VA APT IIP-05 Principal Investigator	<i>Conformal, Low-Intensity Ultrasound Arrays ... Image-Guided Tibial Neuromodulation</i> <u>\$50,000</u> 2019
LSCVAMC Principal Investigator	<i>Smart Artificial Urinary Sphincter</i> <u>\$26,000</u> 2019
LSCVAMC Principal Investigator	<i>Access AutoCheck – Point-of-Care Screening of ... Vascular Access Risk</i> <u>\$9,850</u> 2019
Medtronic Principal Investigator	<i>Minimally Invasive Bladder Pressure Sensor</i> <u>\$38,000</u> 2018
VA VISN RIP Principal Investigator	<i>Wireless Graft ... Monitoring Using PDMS-Based Flexible Pulsation Sensors</i> <u>\$19,451</u> 2017
VA RR&D CDA-1 Principal Investigator	<i>Real-Time Monitoring Device for Vascular Signals</i> <u>\$192,000</u> 2016
NIH NIDDK SBIR P2 Consultant	<i>Clinical Feasibility of Wireless Catheter-Free Urodynamics ...in the Home Setting</i> <u>\$1,866,922</u> 2021

NIH R56	<i>The UroMonitor: Innovative Technology ... Management of Bladder Dysfunction</i>	
Co-Investigator	<u>\$735,659</u>	2021
Case-Coulter TRP	<i>Closed-Loop Treatment of Refractory Hypertension ... Flexible Pulsation Sensor</i>	
Co-Investigator	<u>\$123,000</u>	2021
NIH NCAI / CCTRP	<i>Activation of the Baroreflex via Stimulation ... Treatment of Refractory Hypertension</i>	
Co-Investigator	<u>\$150,000</u>	2020
Craig H Neilsen Foundation	<i>Closed-loop Bladder Neuromodulation to Restore Continence After Spinal Cord Injury</i>	
Co-Investigator	<u>\$736,000</u>	2019
DoD CDMRP SCIRP-TRA	<i>Ambulatory Bladder Monitoring After Spinal Cord Injury</i>	
Co-Investigator	<u>\$1,475,605</u>	2019
VA VISN SPARK	<i>Smart Foot Position and Pressure Sensor for Power Wheelchairs</i>	
Co-Investigator	<u>\$25,000</u>	2018
DARPA SBIR PI	<i>Flexible Conformal Ultrasound Arrays for Imaging &amp; Modulation</i>	
Consultant	<u>\$67,500</u>	2018
NIH NHLBI SBIR PI	<i>High Resolution Ultrasonic Micro Transducer for In Utero Procedures</i>	
Co-Investigator	<u>\$224,912</u>	2018
Boston Ped Dev Cons	<i>Smart Artificial Urinary Sphincter for Pediatric Patients</i>	
Co-Investigator	<u>\$50,000</u>	2018
VA VISN	<i>Smart Artificial Urinary Sphincter</i>	
Co-Investigator	<u>\$50,000</u>	2018
NIH NHLBI NCAI	<i>High Resolution IVUS</i>	
Co-Investigator	<u>\$137,535</u>	2017
NIH SPARC OT2	<i>Conscious Ambulatory Bladder ... Neural Control of Lower Urinary Tract</i>	
Co-Investigator	<u>\$2,515,171</u>	2017
VA iNET Seed	<i>Intervention to Prevent Power Wheelchair User Foot and Leg Injuries</i>	
Co-Investigator	<u>\$50,000</u>	2017

## EDUCATION

Case Western Reserve University, Cleveland, OH

<b>PhD in Electrical Engineering</b> (adviser: Steven L. Garverick)	2014
<b>MSc in Electrical Engineering</b> (adviser: Steven L. Garverick)	2008
<b>BS in Electrical Engineering</b>	2008

## TEACHING EXPERIENCE

Case Western Reserve University, Cleveland, OH

Guest Lecturer – Advanced Integrated Circuit Design	2015-2018
Substitute Lecturer – Special Topics in CMOS Integrated Circuits	2015-2017
Substitute Lecturer – Electronic Analysis & Design	2015-2017
Teaching Assistant – Analysis of Signals & Systems	2010-2013
Teaching Assistant – Digital Logic	2007-2009
Course Tutor – Analysis of Signals & Systems	2008-2010
Teaching Assistant – Introduction to Circuits	2006-2007

## STUDENT RESEARCH SUPERVISION

Hao Chong (PhD EE, 2018-2021), Wangbo Chen (BME / BS/MS EE 2020-), Rohan Sinha (BS/MS EE, 2019-), Yaneev Hacohen (BS/MS EE, 2019-), Jeremiah Ukwela (BS BME, 2021-), Vikram Abbaraju (BS/MS EE, 2021-)

*Previously:* Jason Lou (BS EE), David Ariando (PhD EE), Junjun Huan (PhD EE), Binit Panda (MS BME), Ian McAdams (MS EE), Stephanie Chin (BS BME), Connor Swingle (BS BME), Daniel Barbaro (BS CS), Hannah Kenyon (BS BME)

## ACADEMIC COMMITTEE MEMBER

Vida Pashaei	Electrical Engineering, PhD, CWRU	2021
Hao Chong	Electrical Engineering, PhD, CWRU	2021.
Rohan Sinha	Electrical Engineering, MS, CWRU	2022 est.
Yaneev Hacohen	Electrical Engineering, MS, CWRU	2022 est.
Wangbo Chen	Electrical Engineering, MS, CWRU	2022 est.
Binit Panda	Biomedical Engineering, MS, CWRU	2019
Ian McAdams	Electrical Engineering, MS, CWRU	2018

## HONORS AND AWARDS

Best in Category Prize: Continece Technologies, <i>Intl Continece Society Annual Meeting</i>	2020
Louis Stokes Research Fellowship	2018
Invited Paper, <i>Institute of Electrical and Electronics Engineers (IEEE) Midwest Circuits and Systems Conference</i>	2017
Best Paper Award, <i>2016 IEEE Intl Biomedical Circuits &amp; Systems Conference</i>	2016
Senior Member, <i>IEEE</i>	2016
Invited Paper, <i>2016 IEEE Intl Sensors Conference</i>	2016
National Science Foundation I-Corps	2016
Poster Award, <i>Innovating for Continece Conference</i>	2015
Best Poster Silver Medal, Research Showcase, Case Western Reserve University	2009
Research Excellence Award, Case Western Reserve University	2008
<i>Magna cum laude</i> , Case Western Reserve University, B.S.E.	2007

## PATENTS

*Wireless Bowel Sensor*. U.S. Patent No.16/514,982, filed 07/2019, **issued** 10/2021.

*Implantable Pressure Sensor*. U.S. Patent No.143,391 B2, EP 13724109.7, **issued** Dec 4, 2018. **Licensed** Sept 2021.

*Automated Bladder Event Detection from Bladder Pressure Measurement*. U.S. Patent Application 16/360,126, EP 19164995.3, filed 2018. **Licensed** Sept 2021.

*Systems and Methods for Estimating a Volume of a Hollow Organ*. US Patent Application No. 16/074,149, filed July 2018. **Allowed** Sept 2021. **Licensed** Sept 2021.

*Bladder Event Detection for Diagnosis of Urinary Incontinence or Treatment of Lower Urinary Tract Dysfunction*. U.S. Patent No. US 10,478,113, EP 16724991.1, **issued** June 2019. **Licensed** May 2021.

*Single channel detrusor pressure determination*, US Patent Application 63/051,508, filed 2017. **Licensed** May 2021.

*Abdominal Pressure from Bladder Contraction Detection System*. US Patent No. 62/154,350, filed October 2018. **Licensed** May 2021.

*Smart Foot Position Sensor for Power Wheelchair Users*. US Patent No. 62/480,804, filed 2017, **issued** May 2021

*Sensing Device for Ambulatory Urodynamics Having a Pressure Sensitive Housing*. US Patent Application 17/058,783, PCT/US2019/034123, filed November 2020.

*Conductive Layer Formed Strain Gauge and Method of Making Same*. (originally: Flexible Pulsation Sensor) US Patent Application No. 10,694,999 **issued** April 2020.

*Flexible Pressure Sensor with Wireless Monitoring Capability*. US Provisional Patent Application 63/077,808, filed September 2020.

*Devices and Systems for Treatment of Urinary Incontinence, and Methods of Making and Using Same*. PCT/US Application number 2019/020318, filed March 2019.

*Flexible Body-Conformal Ultrasound Patches for Image-Guided Peripheral Nerve Modulation*. US Provisional Patent Application, filed Jan. 2020.

*Flexible, Skin-Coupled Microphone Array for Point-of-Care Vascular Access Monitoring*. US Provisional Patent Application, filed Nov. 2018.

*Intraluminal Pressure and Volume Sensor with Novel Housing and Sensor Configuration*, PCT 2019/034123, filed 2017.

## PUBLICATIONS AND PAPERS

*Journal Publications*

\* corresponding author

**SJA Majerus**, Sarah J Offutt, T Brink, B Panda, V Vasoli, I McAdams, MS Damaser, L Zirpel, "Feasibility of Real-Time Conditional Sacral Neuromodulation using Wireless Bladder Pressure Sensor." *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 29, pp. 2067-2075, 2021.

K Janssen, K Deng, **SJA Majerus**, DL Lin, B Hanzlicek, RS Butler, CH van der Vaart, MS Damaser, "Transurethral versus suprapubic catheterization to test urethral function in rats." *Scientific Reports*, vol. 11, no. 1, 14369, 2021.

M Caveney, **SJA Majerus**, K Deng, B Hanzlicek, B Panda, J Mrowca, D Bourbeau, M Damaser, "PD27-02 Wireless Catheter-Free Ambulatory Urodynamics for Bladder Physiology Research." *Journal of Urology*, vol. 206, no. S3, pp. e443-e444, 2021.

BT Frainey, **SJA Majerus**, S Derisavifard, BM Balog, RS Butler, HB Goldman, and MS Damaser, "PD66-05 Wireless Catheter-Free Ambulatory Urodynamics for Bladder Physiology Research." *Journal of Urology*, vol. 206, no. S3, pp. e1160-e1160, 2021.

H Chong, **SJA Majerus**, KM Bogie, CA Zorman, "Non-hermetic Packaging of Biomedical Microsystems from a Materials Perspective: A Review." *Medical Devices and Sensors*, vol. 3, no. 6, 2020.

V Pashaei, P Dehghanzadeh, G Enwia, M Bayat, **SJA Majerus**, S Mandal, "Flexible Body-Conformal Ultrasound Patches for Image-Guided Neuromodulation," *IEEE Trans. on Biomedical Circuits and Systems*, vol. 14, no. 2, 2020.

B Panda, S Mandal, **SJA Majerus**, "Flexible, Skin-Coupled Microphone Array for Point of Care Vascular Access Monitoring." *IEEE Transactions on Biomedical Circuits and Systems*, vol. 13, no. 6, pp. 1494-1505, 2019.

H Chong, J Lou, KM Bogie, CA Zorman, **SJA Majerus**, "Vascular Pressure-Flow Measurement using CB-PDMS Strain Sensor." *IEEE Transactions on Biomedical Circuits and Systems*, vol. 13, no. 6, pp. 1451-1461, 2019.

B Abelson, **SJA Majerus**, D Sun, BC Gill, E Versi, MS Damaser, "Ambulatory Urodynamic Monitoring: State of the Art and Future Directions." *Nature Reviews Urology*, vol. 16, pp 291–301, 2019.

A Basu, **SJA Majerus\***, L Ferry, I Makovey, H Zhu, MS Damaser, "Is Submucosal Bladder Pressure Monitoring Feasible?" *Journal of Engineering in Medicine*, 2018

R Karam, **SJA Majerus**, D Bourbeau, MS Damaser, S Bhunia, "Tunable and Lightweight On-chip Event Detection for Implantable Bladder Pressure Monitoring Devices." *IEEE Trans Biomed Circuits and Systems* vol. 11, no. 6, 2017

**SJA Majerus** and MS Damaser, "Quantitative Analysis of Technological Innovation in Urology: Invited Editorial Comment." *Urology*, vol. 111, pp. 236, 2017

**SJA Majerus**, PC Fletter, EK Ferry, H Zhu, KJ Gustafson, MS Damaser "Suburothelial Bladder Contraction Detection with Implanted Pressure Sensor." *PLoS One*, vol. 12, no. 1, e0168375, 2017

R Karam, D Bourbeau, **SJA Majerus**, I Makovey, HB Goldman, MS Damaser, S Bhunia, "Real-Time Classification of Bladder Events for Effective Diagnosis and Treatment of Urinary Incontinence," *IEEE Transactions on Biomedical Engineering*, vol. 63, no. 4, pp. 721-729, 2016

I Makovey, **SJA Majerus**, R Karam, B Hanzlicek, M Streicher, H Zhu, MS Damaser, "Wireless Implantable Rechargeable Bladder Pressure Sensor: Cystoscopic Implantation and Ambulatory Data Collection." *The Journal of Urology*, vol. 193, no. 4, e489, 2015

**SJA Majerus**, SL Garverick, MA Suster, PC Fletter, MS Damaser, "Wireless, Ultra-low-power Implantable Sensor for Chronic Bladder Pressure Monitoring." *ACM Journal of Emerging Technology*, vol. 8, no. 2, pp. 11.1-11.13, 2012

P Fletter, **SJA Majerus**, H Zhu, A Boger, S Garverick, K Gustafson, M Damaser, "Feasibility of Submucosal Bladder Pressure Sensing." *Journal of Urology*, vol. 185, no. 4, pp. e317–e318, 2011

**SJA Majerus**, PC Fletter, MS Damaser, SL Garverick, "Low-power Wireless Micromanometer System for Acute and Chronic Bladder-Pressure Monitoring." *IEEE Trans on Biomedical Engineering*, vol. 58, no. 3, pp. 763-768, 2011

*Edited Books and Book Chapters*

**SJA Majerus**, R Sinha, B Panda, HM Lavasani, "Prediction of vascular access stenosis through multi-domain acoustic analysis of vascular blood sounds," in *Biomedical Signal Processing: Innovations and Applications*, I Obeid, I Selesnick, J Picone, Springer Intl, pp. 161 – 194, 2021.

B Panda, S Chin, S Mandal, **SJA Majerus**, "Noninvasive Vascular Blood Sound Monitoring Through Flexible PVDF Microphone," in *Emerging Trends in Signal Processing in Medicine and Biology*, I Obeid, J Picone, I Selesnick, Springer Nature, pp. 35-68, 2020.

S Bhunia, **SJA Majerus**, M Sawan, *Implantable Biomedical Microsystems*. Oxford, UK: Elsevier Science & Technology, 2015

**SJA Majerus**, S Bhunia, M Sawan, "Introduction." in *Implantable Biomedical Microsystems*, Oxford, UK: Elsevier Science & Technology, 2015, pp. 3-12

**SJA Majerus**, PC Fletter, H Zhu, MS Damaser, "Implantable Bladder Pressure Sensor for Chronic Application: A Case Study," in *Implantable Biomedical Microsystems*, S. Bhunia, **S. Majerus**, M. Sawan, Oxford, UK: Els. Science & Tech., 2015, pp. 231-250

*Conference Full Papers (4-page, peer-reviewed)*

H Chong, J J Lou, C A Zorman, **SJA Majerus**, "Wireless Monitoring of Vascular Pressure Using CB-PDMS Based Flexible Strain Sensor." *IEEE Eng in Medicine and Biology Conf*, Guadalajara, Mexico, November 2021.

W Chen, A Fleischman, **SJA Majerus**, "A 100-V Withstanding Analog Front-End for High-Resolution Intravascular Ultrasound Imaging." *IEEE Eng in Medicine and Biology Conf*, Guadalajara, Mexico, November 2021.

R K Sinha, H M Lavasani, C Zorman, **SJA Majerus**, "Acoustic Bruit Transduction Interface for Non-Invasive Vascular Access Monitoring." *IEEE Eng in Medicine and Biology Conf*, Guadalajara, Mexico, November 2021.

**SJA Majerus**, J Ukwela, J Lerchbacker, KM Bogie, MK Henzel, "Development of Foot Displacement Detection Algorithm for Power Wheelchair Footplate Pressure and Positioning." *IEEE Eng in Medicine and Biology Conf*, Guadalajara, Mexico, November 2021.

MK Henzel, SJ Mitchell, JA Lerchbacker, **SJA Majerus**, KM Bogie "The case for active safety for power wheelchair users with spinal cord injury," *2020 RESNA Virtual Conference*, Pittsburgh, USA, September 23-24, 2020.

B Panda, S Mandal and **SJA Majerus**, "Vascular stenosis detection using temporal-spectral differences in correlated acoustic measurements," *2019 IEEE Signal Processing in Medicine and Biology Conf*, Philadelphia, USA, Dec 7 2019.

B Panda, S Chin, S Mandal and **SJA Majerus**, "Skin-Coupled PVDF Microphones for Noninvasive Vascular Blood Sound Monitoring," *2018 IEEE Signal Processing in Medicine and Biology Conf*, Philadelphia, USA, Dec 1 2018.

S Chin, B Panda, MS Damaser and **SJA Majerus**, "Stenosis Characterization and Identification for Dialysis Vascular Access," *2018 IEEE Signal Processing in Medicine and Biology Conf*, Philadelphia, USA, Dec 1 2018.

S Mahmud, **SJA Majerus**, MS Damaser and R Karam, "Design Tradeoffs in Bioimplantable Devices: A Case Study with Bladder Pressure Monitoring," *IEEE On-Line Testing Robust Sys Design*, Platja D'Aro, Spain, 2018, pp. 69-72.

I McAdams, H Kenyon, D Bourbeau, MS Damaser, C Zorman, **SJA Majerus**, "Low-Cost, Implantable Wireless Sensor Platform for Neuromodulation Research." *2018 IEEE Bio Circ and Sys Conf*, Cleveland, USA, Oct 18 2018.

**SJA Majerus**, H Chong, D Ariando, C Swingle, J Potkay, KM Bogie, CA Zorman, "Vascular Graft Pressure-Flow Monitoring Using 3D Printed MWCNT-PDMS Strain Sensors." *2018 IEEE Eng in Medicine and Biology Conf*, Honolulu, USA, July 17–21, 2018.

**SJA Majerus**, T Knauss, S Mandal, G Vince, MS Damaser, "Bruit-enhancing phonoangiogram filter using sub-band autoregressive linear predictive coding." *IEEE Eng in Medicine and Biology Conf*, Honolulu, USA, July 17–21, 2018.

**SJA Majerus**, J Lerchbacker, D Barbaro, SJ Mitchell, KM Bogie, MK Henzel, "Power Wheelchair Footplate Pressure and Positioning Sensor." *IEEE Eng in Medicine and Biology Conf*, Honolulu, USA, July 17–21, 2018.

A Smiley, **SJA Majerus**, I McAdams, B Hanzlicek, D Bourbeau, M.S. Damaser, "Sensors Selection for Continuous Monitoring of Bowel State and Activity." *IEEE Eng in Medicine and Biology Conf*, Honolulu, USA, July 17–21, 2018.

I McAdams, **SJA Majerus**, B Hanzlicek, C Zorman, D Bourbeau, MS Damaser, "A Conductance-Based Sensor to Estimate Bladder Volume in Felines." *IEEE Eng in Medicine and Biology Conf*, Honolulu, USA, July 17–21, 2018.

**SJA Majerus**, S Mandal, A Fleischman, "Catheter-mounted CMOS Front-Ends for Broadband Intravascular Ultrasonic Imaging." *2017 IEEE Midwest Symp. on Circuits and Sys.*, Boston, USA, Aug. 6–10, 2017. **[INVITED]**

**SJA Majerus**, X Tang, J Liang, and S Mandal, "Embedded Silicon Odometers for Monitoring the Aging of High-Temperature Integrated Circuits." *IEEE Aerospace Electronics Conf (NAECON)*, Dayton, OH, June 2017 **[INVITED]**

**SJA Majerus**, A Basu, I Makovey, P Wang, H Zhu, C Zorman, W Ko, MS Damaser, "Wireless bladder pressure monitor for closed-loop bladder neuromodulation." *IEEE Sensors Conf*, Oct. 30–Nov. 2, 2016. **[INVITED]**

**SJA Majerus**, J Dunning, J Potkay, KM Bogie, "Flexible, structured MWCNT/PDMS sensor for chronic vascular access monitoring" *2016 Intl IEEE Sensors Conference*, Orlando, Florida, Oct. 30–Nov. 2, 2016.

R Karam, **SJA Majerus**, D Bourbeau, M Damaser, S Bhunia, "Ultralow-Power Data Compression for Implantable Bladder Pressure Monitor: Algorithm and Hardware Implementation." *IEEE Bio Circ Systems Conf (BIOCAS)*, Shanghai, China, Oct. 17-19, 2016. **[BEST PAPER AWARD]**

R Karam, S Bhunia, **SJA Majerus**, SW Brose, MS Damaser, D Bourbeau, "Real-time, Autonomous Bladder Event Classification and Closed-Loop Control from Single-Channel Pressure Data." *Intl Engineering in Medicine and Biology Conference (EMBC) 2016*, Orlando, Florida, Aug. 17-20, 2016.

**SJA Majerus**, I Makovey, H Zhu, WH Ko, MS Damaser, "Wireless implantable pressure monitor for conditional bladder neuromodulation." *2015 Intl. Biomedical Circuits and Systems Conference*, Atlanta, Georgia, Oct. 22, 2015.

**SJA Majerus**, MS Damaser, "Automatic drift cancellation of implanted bladder pressure sensor." *2015 Intl. Biomedical Circuits and Systems Conference*, Atlanta, Georgia, Oct. 22, 2015.

P Wang, **SJA Majerus**, R Karam, S Bhunia, B Hanzlicek, DL Lin, H Zhu, JM Anderson, MS Damaser, CA Zorman, WH Ko, "Long-Term Evaluation of Non-hermetic Micropackage Technology for Pressure Sensor in Medical Microsystem," *IEEE Solid-State Sensors, Actuators, and Microsystems*, Anchorage, AK, June 21-25, 2015.

**SJA Majerus**, SL Garverick, MS Damaser, "Wireless battery charge management for implantable pressure sensor." *IEEE Dallas Circuits and Systems Conf (DCAS)*, Dallas, TX, USA, Oct. 11-13, 2014.

**SJA Majerus**, D Goff, W Merrill, SL Garverick, "A 200 °C custom CMOS chipset for distributed control applications." *12<sup>th</sup> Intl. Energy Conversion Engineering Conf.*, Cleveland, OH, USA, July 28-30, 2014.

**SJA Majerus**, D Goff, W Merrill, SL Garverick, "A 200 °C Motor Control ASIC." *2014 International Conference on High Temperature Electronics (HiTEC 2014)*, Albuquerque, NM, USA, May 13–15, 2014, pp. 159-164.

D Goff, **SJA Majerus**, W Merrill, SL Garverick, "A 200 °C Quad-Output Switched Mode Power Supply IC." *2014 Intl. Conf. on High Temperature Electronics (HiTEC 2014)*, Albuquerque, NM, USA, May 13–15, 2014, pp. 22-27.

**SJA Majerus**, SL Garverick, "Power Management Circuits for a 15- $\mu$ A, Implantable Pressure Sensor." *IEEE Custom Integrated Circuits Conference*, San Jose, CA, September 15–17, 2013.

**SJA Majerus**, W Merrill, SL Garverick, "Design and long-term operation of high-temperature, bulk-CMOS integrated circuits for instrumentation and control." *IEEE EnergyTech 2013*, Cleveland, OH, USA, May 21 – 23, 2013.

**SJA Majerus**, D Howe, SL Garverick, W. Merrill, K. Semega, "High-temperature, distributed control using custom CMOS ASICs." *Proc. of the 2012 SAE Power Systems Conference*, Phoenix, AZ, USA, Oct. 30 – Nov. 1, 2012.

D Howe, **SJA Majerus**, SL Garverick, W. Merrill, K. Semega, "High-temperature, bulk-CMOS integrated circuits for a distributed control system – performance results." *Proc. of the 2012 IMAPS Intl. Conf. on High Temperature Electronics (HITEC 2010)*, Albuquerque, NM, USA, May 8-10, 2012, pp. 2-9.

W Merrill, JH Kim, S Lall, **SJA Majerus**, D Howe, A Behbahani, "Distributed engine control design considerations." *Proc. of the 46th AIAA/ASME/SAE/ASEE Joint Propulsion Conf. and Ex.* July 25-28, 2010.

**SJA Majerus**, D Howe, SL Garverick, D Hiscock, W. Merrill, "High-temperature, bulk-CMOS integrated circuits for a distributed FADEC system." *IMAPS Intl. Conf. and Exhibition on High Temperature Electronics (HITEC 2010)*, Albuquerque, NM, USA, May 11-13, 2010, pp. 47-53.

PC Fletter, **SJA Majerus**, P Cong, MS Damaser, WH Ko, DJ Young, SL Garverick, "Wireless micromanometer system for chronic bladder pressure monitoring." *IEEE Conf Netw Sens Sys (INSS)*, Pittsburgh, USA, 2009, pp 1-4.

**SJA Majerus** and SL Garverick, "Telemetry platform for deeply implanted biomedical sensors." *Proc. of the Fifth Intl. Conference on Networked Sensing Systems (INSS 2008)*, Kanazawa, Japan, June 17-19, 2008, pp. 87-92.

#### Conference Abstracts

**SJA Majerus**, Y Hachohen, B Hanzlicek, A Rietsch, J Mrowca, A Smiley, Y Wang, W Liu, M Larauche, M Mulugeta, MS Damaser, DJ Bourbeau, "SPARC - Catheter-Free Measurement of Bowel Activity using Wireless Intracolonic Sensor." *Society for Neuroscience (SfN) Annual Meeting*, 2021.

DJ Bourbeau, **SJA Majerus**, B Hanzlicek, M Caveney, A Rietsch, BM Balog, MS Damaser, "SPARC - effects of sacral root stimulation on bladder and pelvic floor activity in awake, behaving cats." *Society for Neuroscience (SfN) Annual Meeting*, 2021.

**SJA Majerus**, J Ukwela, J Lerchbacker, KM Bogie, MK Henzel, “Development of Foot Displacement Detection Algorithm for Power Wheelchair Footplate Pressure and Positioning.” *American Society of Biomechanics Midwest Meeting*, September 2021.

B Frainey, **SJA Majerus**, S Derisavifard, B Balog, S Butler, H Goldman, MS Damaser, “Safety, Feasibility, and Accuracy of the UroMonitor: A Catheter-Free Wireless Ambulatory Cystometry Device.” *Engineering in Urology Society (EUS) Annual Meeting*, Las Vegas, NV, USA, Sept 2021. **[BEST PAPER AWARD]**

**SJA Majerus**, Y Hachohen, B Hanzlicek, A Rietsch, J Mrowca, A Smiley, Y Wang, W Liu, M Larauche, M Mulugeta, MS Damaser, DJ Bourbeau, “Catheter-Free Measurement of Bowel Activity using Wireless Intracolonic Sensor.” *International Continence Society (ICS) Annual Meeting*, Oct. 2021.

B Frainey, **SJA Majerus**, S Derisavifard, B Balog, S Butler, H Goldman, MS Damaser, “Safety, Feasibility, and Accuracy of the UroMonitor: A Catheter-Free Wireless Ambulatory Cystometry Device.” *American Urological Association (AUA) Annual Meeting*, Las Vegas, NV, USA, Sept 2021. **[PODIUM]**

S Derisavifard, **SJA Majerus**, MS Damaser, H Goldman, “UroMonitor Catheter Free Ambulatory Cystometry is Feasible, Safe, and Well-Tolerated.” *International Continence Society (ICS) Annual Meeting*, Las Vegas, USA, 2020. **[PODIUM] [BEST PRESENTATION AWARD]**

**SJA Majerus**, K Deng, B Hanzlicek, B Panda, J Mrowca, DJ Bourbeau, MS Damaser, “Catheter-Free Wireless Measurement of Feline Bladder Pressures Using Intravesical Sensor.” *International Continence Society (ICS) Annual Meeting*, Las Vegas, USA, 2020. **[PODIUM] [BEST IN BASIC SCIENCE AWARD]**

**SJA Majerus**, S Offutt, T Brink, MS Damaser, L Zirpel, “Real-Time Conditional Sacral Neuromodulation Using Wireless Bladder Pressure Sensor.” *International Continence Society (ICS) Annual Meeting*, Las Vegas, USA, 2020. **[PODIUM]**

**SJA Majerus**, K Deng, B Hanzlicek, B Panda, J Mrowca, DJ Bourbeau, MS Damaser, “Catheter-Free Wireless Measurement of Feline Bladder Pressures Using Intravesical Sensor.” *American Urological Association (AUA) Annual Meeting*, Washington, DC, USA, May 2020. **[PODIUM]**

**SJA Majerus**, B Hanzlicek, B Panda, J Mrowca, A Rietsch, K Deng, DJ Bourbeau, MS Damaser, “Catheter-Free Wireless Measurement of Feline Bladder Pressures Using Intravesical Sensor.” *Experimental Biology*, San Diego, USA, April 2020

B Panda, A Smiley, **SJA Majerus**, A Rietsch, J Yang, K Deng, B Hanzlicek, JA Mrowca, MS Damaser, DJ Bourbeau, “Wireless, Continuous Monitoring of Bowel State and Function.” *Experimental Biology*, San Diego, USA, April 2020

M Damaser **SJA Majerus**, J Mrowca, B Hanzlicek, A Smiley, I McAdams, D Bourbeau, “Wireless Monitors for Recording Bladder and Bowel Function in Conscious Ambulatory Animals,” *International Urogenital Society Meeting*, Tlaxcala, Mexico, 2019 **[PODIUM]**

**SJA Majerus**, N Desai, “Algorithmic Estimation of Vascular Access Dysfunction from Serial Bruit Recordings,” *American Society of Nephrology Kidney Week*, Washington, DC, 2019.

B Abelson, I McAdams, S Butler, **SJA Majerus**, M Damaser, “Urine Conductivity for Use in Ambulatory Urodynamics,” *2019 SUFU Winter Meeting*, Miami, FL, USA, Feb 26 2019.

DJ Bourbeau, **SJA Majerus**, CT Nguyen, GA Nemunaitis, MS Damaser, “Automated closed-loop stimulation to inhibit neurogenic bladder overactivity,” *2019 SUFU Winter Meeting*, Miami, FL, USA, Feb 26 2019.

DJ Bourbeau, **SJA Majerus**, CT Nguyen, GA Nemunaitis, MS Damaser, “Automated closed-loop stimulation to inhibit neurogenic bladder overactivity,” *Soc for Pelvic Research Ann Mtg*, New Orleans, LA, USA, Dec 1 2018.

A Smiley, **SJA Majerus**, IS McAdams, A Rietsch, MS Damaser, DJ Bourbeau “Wireless Real-Time Sensor Platform for Monitoring Bowel State and Function,” *Soc for Pelvic Research Ann Mtg*, New Orleans, LA, USA, Dec 1 2018.

**S Majerus**, I McAdams, A Smiley, D Bourbeau, M Damaser, “Wireless real-time sensor platforms for bladder and bowel preclinical research models.” *International Continence Society Annual Meeting*, Philadelphia, USA, Aug 2018.

B Abelson, **SJA Majerus**, P Babbar, B Gill, D Greene, H Zhu, M Damaser, “Uromonitor: Insertion, retention and extraction of ambulatory urodynamic monitoring prototype in humans and large animals.” *33<sup>rd</sup> Engineering and Urology Society Annual Meeting (AUA EUS 2018)*, San Francisco, CA, May 2018.

B Abelson, **SJA Majerus**, S Butler, H Goldman, MS Damaser, “Urine conductivity for use in ambulatory urodynamic monitoring.” *33<sup>rd</sup> Engineering and Urology Society Annual Meeting (AUA EUS 2018)*, San Francisco, CA, May 2018.

A Basu, **SJA Majerus**, I Makovey, H Zhu, M Damaser, “Is sub-mucosal wireless pressure sensing feasible: observations from initial implantation studies.” *Innovating for Continence: The Eng. Challenge*, Chicago, IL, 2017.

- C Lee, **SJA Majerus**, A Basu, M Damaser, "Design of a sensor to measure bladder volume using electrical conductance." *Innovating for Continence: The Engineering Challenge*, Chicago, IL, April 2017.
- R Karam, **SJA Majerus**, S Bhunia, SW Brose, MS Damaser, D. Bourbeau, "Autonomous closed-loop genital nerve stimulation identifies and inhibits hyper-reflexic bladder contractions." *31<sup>st</sup> Engineering and Urology Society Annual Meeting (AUA EUS 2016)*, San Diego, CA, May 7, 2016.
- X Yuan, BW Hanzlicek, DL Lin, **SJA Majerus**, MS Damaser, "The application of an innovative surface electrode system in external urethral sphincter electromyography testing in rats." *31<sup>st</sup> Engineering and Urology Society Annual Meeting (AUA EUS 2016)*, San Diego, CA, May 7, 2016.
- SJA Majerus**, P Wang, WH Ko, C Zorman, MS Damaser, "Chronic biocompatibility evaluation of multi-layer, non-hermetic packaging approach for implantable medical microsystems." *American Vacuum Society Ohio Chapter Annual Meeting*, Cleveland, OH, Oct. 10 2015. **[PODIUM]**
- I Makovey, R Karam, **SJA Majerus**, D Bourbeau, H Zhu, S Bhunia, MS Damaser, "Event detection algorithm in single channel bladder pressure recording." *30<sup>th</sup> Eng. Urology Soc. Mtg. (AUA EUS 2015)*, New Orleans, LA, May 16, 2015.
- I Makovey, **SJA Majerus**, E Ferry, H Zhu, MS Damaser, "Cystoscopic implantation of a wireless implantable rechargeable bladder pressure sensor." *Innovating for Continence: The Engineering Challenge*, Chicago, IL, April 2015. **[POSTER AWARD]**
- R Karam, D Bourbeau, **SJA Majerus**, I Makovey, H Goldman, MS Damaser, S Bhunia, "Real-time contraction event detection from bladder pressure recordings for effective diagnosis and treatment of urinary incontinence." *Innovating for Continence: The Engineering Challenge*, Chicago, IL, April 2015
- SJA Majerus**, I Makovey, E Ferry, P Wang, B Hanzlicek, M Streicher, WH Ko, H Zhu, MS Damaser, "Demonstration of wireless, catheter-free bladder pressure sensor for ambulatory monitoring and closed-loop bladder control." *Innovating for Continence: The Engineering Challenge*, Chicago, IL, April 2015
- SJA Majerus**, I Makovey, E Ferry, P Wang, B Hanzlicek, M Streicher, WH Ko, H Zhu, MS Damaser, "Cystoscopic implantation and ambulatory demonstration of a wireless pressure sensor for real-time, catheter-free bladder pressure monitoring." *2015 American Soc of Biomechanics Regional Meeting*, Akron, OH, Feb. 17, 2015 **[PODIUM]**
- P Wang, **SJA Majerus**, JM Anderson, MS Damaser, CA Zorman, WH Ko, "Long-Term Implant Evaluation of Non-hermetic Micropackage Technology," in *Proc. Ann. Int. Conf. IEEE Eng. Med. Biol. Soc.*, San Antonio, TX, 2014
- E Ferry, **SJA Majerus**, H Zhu, SL Garverick, MS Damaser, "Cystoscopic implantation of a wireless implantable pressure sensor in a large animal model." *29<sup>th</sup> Eng. and Urology Soc. Ann. Mtg.*, Orlando, FL, May 16–21, 2014
- E Ferry, **SJA Majerus**, H Zhu, SL Garverick, MS Damaser, "Cystoscopic submucosal bladder device implantation." *Soc for Urodynamics, Fem Pelvic Med & Urogenital Reconstruction (SUFU)*, Miami, FL, 2014
- E Ferry, **SJA Majerus**, B Balog, M Streicher, H Zhu, MS Damaser, "Calf urodynamics: a novel large-animal urologic model." *Soc for Urodynamics, Fem Pelvic Med & Urogenital Reconstruction (SUFU)*, Miami, FL, 2014
- P Wang, SB Lachhman, D Sun, **SJA Majerus**, MS Damaser, CA Zorman, PXL Feng, WH Ko, "Non-Hermetic Micropackage for Chronic Implantable Systems." *46<sup>th</sup> International Symposium on Microelectronics (IMAPS 2013)*, Orlando, FL, September 30 – October 3, 2013
- P Wang, D Sun, **SJA Majerus**, S Lachhman, S Li, MS Damaser, CA Zorman, WH Ko, "Implantable Pressure Telemetry Device with Thin Film Micropackage." *Bio. Eng. Soc. Ann. Mtg. (BMES 2013)*, Seattle, WA, 2013
- SJA Majerus**, PC Fletter, P Zaszczurynski, H Zhu, MS Damaser, SL Garverick, "In vivo demonstration of an implantable bladder pressure sensor in an ambulatory canine subject." *Point-of-Care Technologies Research Network International Forum*, Sacramento, CA, USA, June 24, 2011
- PC Fletter, **SJA Majerus**, A Boger, K Gustafson, SL Garverick, H Zhu, MS Damaser, "Feasibility of submucosal bladder pressure sensing." *Society of Urodynamics, Female Pelvic Medicine, and Urogenital Reconstruction 2011 Winter Meeting*, Phoenix, AZ, USA, March 1-5, 2011
- PC Fletter, **SJA Majerus**, P Cong, WH Ko, DJ Young, SL Garverick, MS Damaser, "Wireless ambulatory system for chronic bladder pressure monitoring." *BMES 2009 Annual Fall Scientific Meeting*, Pittsburgh, PA, October 7-10, 2009



## INVITED PRESENTATIONS

- “Ambulatory Conditional Bladder Neuromodulation.” *Cleveland VA Research Seminar Series*, Louis Stokes Cleveland VA Medical Center, Cleveland, OH, Sept 2021.
- “Real-time Wireless Pressure Sensing: Opportunities for Conditional Bladder Neuromodulation.” *American Urological Society Basic Science Symposium: Novel Technologies for Benign Urology Research*, Washington, DC, May 17, 2020.
- “Wireless and Catheter-Free Conditional Sacral Neuromodulation Using Intravesical Pressure Sensor.” *Dept of Physical Medicine and Rehabilitation*, MetroHealth Rehabilitation Institute, Cleveland, Jan. 22, 2020
- “Wireless Bladder Pressure Sensing for Conditional Neuromodulation.” *Cleveland Clinic Speaker Spotlight Series – Dept of Biomedical Engineering*, Cleveland Clinic Lerner Research Institute, May 20, 2016
- “A Creative Approach for a Better Power Source.” *MedTechWorld BIOMEDevice Wireless Medical Devices Conference*, San Jose, CA, Dec. 4, 2015
- “Innovating with the Latest Sensor Technologies.” *MedTechWorld BIOMEDevice Wireless Medical Devices Conference*, San Jose, CA, Dec. 3, 2014

## SERVICE

*Reviewer (journals, selected)*

Scientific Reports  
 PLoS ONE  
 Sensors & Actuators: A. Physical  
 Biomedical Microdevices  
 Frontiers in Neuroscience  
 Journal of Vascular Access  
 IEEE Journal of Solid-State Circuits  
 IEEE Transactions on Biomedical Engineering  
 IEEE Transactions on Biomedical Circuits and Systems  
 IEEE Transactions on Neural Systems and Rehabilitation Engineering  
 IEEE Sensors Journal & Letters  
 IEEE Transactions on Circuits and Systems  
 IEEE Transactions on Multi-Scale Computing Systems  
 IEEE Transactions on Microwave Theory and Techniques  
 IEEE Journal on Emerging and Selected Topics in Circuits and Systems

*Conference Activities*

IEEE International Biomedical Circuits and Systems Conference, Co-Chair Live Demos & Review Committee  
 IEEE International Sensors Conference Technical Committee  
 American Urologic Association Engineering and Urology Conference Technical Committee

## SOCIETY MEMBERSHIPS

Senior Member, Institute of Electrical and Electronics Engineers (IEEE)  
 IEEE Solid-State Circuits Society (SSCS)  
 IEEE Sensors Council  
 IEEE Circuits and Systems Society  
 IEEE Engineering in Medicine and Biology Society (EMBS)  
 International Continence Society (ICS)

## PROFESSIONAL ACTIVITIES

Consultant, Consumer Medical Devices	2008 – present
Consultant, High-Temperature and Rad-Hard Electronics	2010 – present
Consultant, Class-III Medical Devices	2018 – 2019
Consultant, Patent Litigation, Electronics	2012 – 2020