

Parker Ludwig

email: parkerludwig@gmail.com
 profile site: parkerludwig.github.io

Education

Creighton University School of Medicine, Omaha, NE 2020
Doctor of Medicine

Brigham Young University, Provo, UT Bachelor of Music: 2016
 Major: **Organ Performance**

Leadership

Co-president, Radiology Interest Group, 2019-2020
 Creighton University School of Medicine

- Plan and conduct meetings designed to introduce medical students to radiology, explore careers in the field, and outline the application and preparation process

Co-president, Ultrasound Interest Group, 2019-2020
 Creighton University School of Medicine

- Plan and conduct point-of-care ultrasound training sessions for first- and second-year medical students
- Teach about the basics of ultrasound technique, types of probes, image orientation, and cardiac, lung, abdominal, and vascular imaging
- Facilitate hands-on sessions with small groups of students

Organ workshop coordinator in various communities 2014-2016

- Coordinated and taught at multiple single-day organ workshops
- Hundreds of attendees in total

Supervisor, Friday's Kids Respite, Orem 2015-2016

- Assigned volunteers to children
- Oversaw all activities

Professional Service

Peer reviewer for *Theranostics* 2019-Present

- Review articles concerning *in vitro* diagnostics and prognostics, image-guided therapy, biosensors, personalized and translational medicine, and biomedical research
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Organizations

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| Radiological Society of North America | 2018-Present |
| American College of Radiology | 2018-Present |
| American College of Physicians | 2018-Present |
| The Guild of Carillonneurs in North America | 2016-Present |
| American Guild of Organists | 2008-Present |

Presentations

Ludwig PE, Huff TJ, Bremer K, Nandipati KC. (2020. August) **Volume variation with the current standard sleeve gastrectomy technique compared to technique employing pressure-sensitive gastric calibration tube: preliminary testing.** Poster presented at the Society of American Gastrointestinal and Endoscopic Surgeons Annual Conference. Cleveland, OH.

Huff TJ, Ludwig PE, Bremer K, Nandipati KC. (2020. August) **Pressure-sensitive gastric calibration tube: development.** Poster presented at the Society of American Gastrointestinal and Endoscopic Surgeons Annual Conference. Cleveland, OH.

Huff TJ, Ludwig PE, Nandipati KC, Fitzgibbons RJ, Stavas JM. (2020. August) **Crural thickness measurements between intraoperative and 3D printed anatomical models.** Poster presented at the Society of American Gastrointestinal and Endoscopic Surgeons Annual Conference. Cleveland, OH.

Andersen D, Ludwig P, Janot A, Angle B. (2019. May) **Intravitreal Injections Among Medicare Part B Beneficiaries, 2012-2016.** Poster presented at the Association for Research in Vision and Ophthalmology Annual Meeting. Vancouver, Canada.

Ludwig PE, Huff TJ, Nandipati KC, Fitzgibbons RJ, Stavas JM. (2019. April) **3D printed anatomical models for preoperative planning of diaphragmatic and abdominal wall hernia repair.** Poster presented at the Midwest Student Biomedical Research Forum. Omaha, NE.

Pflederer N, Horneber E, Wessling D, Ludwig P, Huff T, Lambrecht J. (2018. October) **An ultra-sound education: a qualitative analysis of hands-on ultrasound training during preclinical medical education.** Poster presented at The American College of Physicians Abstract Competition. Omaha, NE.

Ludwig PE, Thankam FG, Patil AA, Agrawal DK. (2018. February) **Adult neural stem cell isolation from whole rat brain and neurosphere culture and differentiation.** Poster presentation at the Midwest Student Biomedical Research Forum. Omaha, NE

Publications

Published peer-reviewed articles

1. Huff TJ, Ludwig PE, Smith CJ, Cramer JA. **Neuroimaging findings of delayed post-hypoxic leukoencephalopathy after acute carbon monoxide poisoning.** *American Journal of Neuroradiology, Case of the Week.* 2020.
2. Ludwig PE, Huff TJ, Helvey JT, Cramer JA. **Neuroimaging findings of stroke-like migraine attacks after radiation therapy (SMART) syndrome.** *American Journal of Neuroradiology, Case of the Week.* 2020.
3. Ludwig PE, Huff TJ, Shanahan MM, Stavas JM. **Pregnancy success and outcomes after uterine fibroid embolization: updated review of published literature.** *The British Journal of Radiology.* 2019;93(1105).
4. Andersen DJ, Ludwig PE, Janot AC. **Intravitreal Injections among Medicare Part B Beneficiaries, 2012-2016.** *Journal of VitreoRetinal Diseases.* 2019;3(4).
5. Huff TJ, Ludwig PE, Salazar D, Cramer JA. **Fully automated intracranial ventricle segmentation on CT with 2D regional convolutional neural network to estimate ventricular volume.** *International Journal of Computer Assisted Radiology and Surgery.* 2019;10(X):1-10.
6. Ludwig PE, Freeman SC, Janot AC. **Novel stem cell and gene therapy in diabetic retinopathy, age related macular degeneration, and retinitis pigmentosa.** *International Journal of Retina and Vitreous.* 2019;5(1):7.
7. Ludwig PE, Patil AA. **Adult neural stem cell isolation from whole rat brain and neurosphere culture and differentiation.** *Bratislava Medical Journal.* 2019;120(1):19–25.
8. Huff TJ, Ludwig PE, Zuniga JM. **The potential for machine learning algorithms to improve and reduce the cost of 3-dimensional printing for surgical planning.** *Expert Review of Medical Devices.* 2018;15(5):349-356.
9. Ludwig PE, Huff TJ, Zuniga JM. **The potential role of bioengineering and three-dimensional printing in curing global corneal blindness.** *Journal of Tissue Engineering.* 2018;9(X):X.
10. Ludwig PE, Thankam FG, Patil AA, Chamczuk AJ, Agrawal DK. **Brain injury and neural stem cells.** *Neural Regeneration Research.* 2018;13(1):7-18.
11. Ludwig PE, Patil AA, Chamczuk AJ, Agrawal DK. **Hormonal therapy in traumatic spinal cord injury.** *American Journal of Translational Research.* 2017;9(9):3881-3895.

Published StatPearls articles

1. **Ludwig PE, Sevensma K. Anatomy, Head and Neck, Eye Cornea.** In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2018. <http://www.ncbi.nlm.nih.gov/books/NBK470340/>.
2. **Ludwig PE, Czyz CN. Anatomy, Head and Neck, Eye Muscles.** In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK470534/>.
3. **Ludwig PE, Czyz CN. Embryology, Eye, Malformations.** In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK482496/>.
4. **Ludwig PE, Bhimji SS. Histology, Glial Cells.** In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK441945/>.
5. **Ludwig PE, Varacallo M. Neuroanatomy, Central Nervous System (CNS).** In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK442010/>.
6. **Ludwig PE, Varacallo M. Neuroanatomy, Neurons.** In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK441977/>.
7. **Ludwig PE, Czyz CN. Physiology, Eye.** In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK470322/>.

Research and inventions

Developing light and sound source for gamma-frequency entrainment **2019-2020**

Solo inventor

- Creating a device that employs a 110-220V alternating current power source through a standard lightbulb base, and produces light and sound stimuli at 40Hz
- Based on recently published research on the benefits of gamma entrainment using sensory stimulus (GENUS) in Alzheimer's mouse models
- Iterative design of multiple prototypes
- "Ambient Gamma Wave Frequency Light and Sound Source," U.S. Provisional Pat. Ser. No. 62857158, filed 04-June-2019.

Developing pressure-sensitive gastric calibration tube **2018-2020**

Creighton University School of Medicine

In coordination with KC Nandipati, MBBS

- Made force-sensitive resistors
- Designed circuit and custom PCB incorporating Arduino Nano and Honeywell pressure sensors in multiple iterations
- Iterative design of multi-lumen tubes
- Designed and built balloons in various sizes and shapes
- Testing in explants

- “Pressure Sensitive Gastric Calibration Tube,” U.S. Provisional Pat. Ser. No. 62806933, filed 18-Feb-2019.

3D printing anatomical models for surgical planning

2018-2020

Creighton University School of Medicine, Departments of Radiology and Surgery,
University of Nebraska at Omaha, Department of Biomechanics

Under the supervision of RJ Fitzgibbons, MD; KC Nandipati, MBBS; JM Stavas, MD; and JM Zuniga, PhD

- Segment 3D models from CT scans for diaphragmatic and abdominal wall hernias, and convert to STL for 3D printing
- Lead coordination and communication between radiology and surgery departments and the 3D printing lab

Estimating brain ventricle volumes with machine learning model

2018-2020

University of Nebraska Medical Center, Department of Radiology

Under the supervision of JA Cramer, MD

- A 2D convolutional neural network performed fully-automated ventricular segmentation on CT images
- Used 300 normal head CTs
- Accurate volume congruence
- Respectable Dice scores
- Working on 3D network and automatic CT head alignment software

In vitro neural stem cell isolation, culture, and differentiation

2017

Creighton University School of Medicine, Department of Clinical and Translational Science

Under the supervision of DK Agrawal, PhD; and FG Thankam, PhD

- Developed effective protocol for isolating and culturing neural stem cells from adult rat brains
- Induced differentiation into astrocytic and neuronal lineages
- Confirmed with immunofluorescence

Investigation of alpaca digestive system

2012, 2014-2016

Brigham Young University, Department of Plant and Wildlife Sciences

Under the supervision of TF Robinson, PhD

- Assisted with second chamber fistulations
- Prepared various feed samples
- Analyzed digested feed samples
- Analyzed urine, blood, and fecal samples using mass spectrometry and ELISA

Employment

Organist **2020**

St. Paul Lutheran Church, Treynor, IA

- Play the organ for traditional Sunday morning services
- Accompany a variety of hymns and liturgy

Yamaguchi Scholar, Summer Research Fellow **2017**

Creighton University School of Medicine, Department of Clinical and Translational Science

- Conducted bench research with neural stem cells from rats
- Performed a variety of lab techniques including immunofluorescence; tissue fixation, preparation, and staining; cell isolation, culture, and differentiation; manual and automated cell counting protocols; and migration assays

University Carillonneur **2010-2012, 2014-2016**

Brigham Young University

- Performed daily, 30-minute recitals on the 52-bell carillon
- Gave tours of the tower when requested to educate the community about the instrument and its history

Organ teacher and church organist **2008-2016**

- Taught private organ lessons for the Brigham Young University Organ Department
- Played for Baptist, Presbyterian, Roman Catholic, Methodist, and Episcopal services

Medical records **2010**

Intermountain ENT Center

- Scanned and organized patient charts

Community Service

Church Organist, Salt Lake City, Provo, Orem, Omaha **2008-Present**

- Play weekly for services and community events of the Church of Jesus Christ of Latter-day Saints

Church Auxiliary Pianist, Salt Lake City, Provo, Madagascar, Omaha **2008-Present**

- Play for church services

Flood Relief, Pacific Junction **2019**

- Performed demolition and restoration work on flooded home

Flood Relief, Glenwood **2019**

- Stocked flood relief site and helped victims locate the supplies they needed

Magis Clinic, Omaha **2017-2019**

- Volunteered in Acute Care and Mental Health clinics

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| HS MACA Eye Presentation and Dissection, Omaha | 2018 |
| <ul style="list-style-type: none"> • Taught middle school students about the function and structure of the human eye in conjunction with The Health Sciences Multicultural and Community Affairs Department (HS-MACA) • Led the students through a cow eye dissection | |
| Carillon Lessons, Omaha | 2018 |
| <ul style="list-style-type: none"> • Provided free lessons to motivated students | |
| Brush Up Nebraska, Omaha | 2017 |
| <ul style="list-style-type: none"> • Painted houses for individuals selected by the program based on need | |
| One Sight Vision Clinic, Omaha | 2017 |
| <ul style="list-style-type: none"> • Helped local ophthalmologists perform vision screenings for elementary and middle school children | |
| Tutoring Refugees, Omaha | 2017 |
| <ul style="list-style-type: none"> • Met with 3rd grade and 5th grade brothers from Myanmar to help with math and English | |
| YES Mentoring, Omaha | 2016-2017 |
| <ul style="list-style-type: none"> • Met with a youth requesting a role model/mentor | |
| Utah Valley Regional Medical Center, Radiology | 2014-2016 |
| <ul style="list-style-type: none"> • Transported and positioned patients for CT scans each week | |
| Friday's Kids Respite, Orem | 2014-2016 |
| <ul style="list-style-type: none"> • Watched and entertained special-needs children on Friday and Saturday nights weekly to give their parents a chance to run errands | |
| Church Mission, Madagascar | 2012-2014 |
| <ul style="list-style-type: none"> • Taught English weekly to people in the cities of Toamasina, Antananarivo, Manandona, and Fianarantsoa • Helped local farmers plant beans, rice and potatoes in rural areas around Manandona and Antsirabe • Oversaw the work of a dozen missionaries in one city, and two dozen in another • Worked with the individual missionaries to provide guidance on lesson planning and teaching • Conducted regular meetings • Trained new missionaries one-on-one for three months each • Taught Malagasy grammar, vocabulary, and pronunciation • Provided insight into local customs and laws • Offered recommendations on effective teaching techniques | |
| Friday's Kids Respite, Salem | 2012 |
| <ul style="list-style-type: none"> • Watched and entertained special-needs children on Friday nights to give their parents a chance to run errands | |

Awards

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| Carillonneur Member Recognition | 2016 |
| The Guild of Carillonneurs in North America (GCNA) Congress, Yale University | |
| <ul style="list-style-type: none"> • The highest level of membership conferred by the GCNA • Involves two stages of judged performances, and significant manuscript preparation | |

1st place, Regional Competition for Young Organists **2011**
American Guild of Organists

- Regional competition for organists under the age of 22

High School Student Award, **2010**
John R. Rodland National Memorial Competition in Organ Playing

- National scholarship competition open to organists pursuing a degree in Organ Performance

3rd Place, Regional Competition for Young Organists **2009**
American Guild of Organists

- Regional competition for organists under the age of 22

Hobbies, Interests, and Additional Skills

Play the organ and carillon

- Notable recitals:
 - **Noon Organ Recitals.** The Tabernacle at Temple Square. Salt Lake City: December 24, 2017; July 3, 2016; June 5, 2016; February 28, 2016; February 21, 2016; February 13, 2016.
 - **Holiday Celebration Recital.** Henningson Memorial Campanile, University of Nebraska. Omaha: December 16, 2017; December 14, 2019.
 - **Summer Carillon Recital Series.** Christ Church Cranbrook. Bloomfield Hills: August 6, 2017.
 - **Summer Carillon Series.** Kirk in the Hills. Bloomfield Hills: August 6, 2017.
 - **2017 Summer Recital Series.** Millennium Carillon, Naperville Park District. Naperville: August 1, 2017.
 - **Carillon Concert Series.** Theodore C. Butz Carillon, Chicago Botanic Garden. Glencoe: July 31, 2017.
 - **The Bells of Summer, 52nd Season.** Rockefeller Memorial Chapel, The University of Chicago. Chicago: July 30, 2017.
 - **Eighth Annual Carillon Summer Recital Series.** The Carl M. Williams Carillon, The University of Denver. Denver: July 23, 2017.
 - **Courtyard Carillon Concert.** First-Plymouth Church. Lincoln: May 20, 2017.
 - **America's Freedom Festival Carillon Concert.** The BYU Centennial Carillon, Brigham Young University. Provo: June 24, 2016.
 - **The Guild of Carillonneurs in North America Congress.** The Yale Memorial Carillon, Yale University. New Haven: June 17, 2016.
 - **Senior Recital.** The Tabernacle at Temple Square. Salt Lake City: March 29, 2016
 - **Utah Valley American Guild of Organists Super Saturday Recital.** Madsen Recital Hall, Brigham Young University. Provo: April 21, 2012.
 - **Sophomore Recital.** First Baptist Church. Salt Lake City: November 11, 2011.

Fluent in Malagasy

- Proficient in Teny Merina, Betsileo, and Betsimisaraka (3 different dialects)

Computer and electronics experience

- Image Segmentation
- 3D printing and anatomical modeling
- Computer-aided design (CAD)
- Various projects with Arduino and Raspberry Pi boards and other microcontroller units
- Custom PCB design and population
- Ruby, Python, C++, Markdown, HTML and CSS

Familiar with the processes of applying for provisional and non-provisional patents