

# Parker Ludwig

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## Education

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Creighton University School of Medicine, Omaha, NE **2020**  
**Doctor of Medicine**, anticipated May 2020

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

## Leadership

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**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

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**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

## 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

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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

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### *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

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### **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

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### **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

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### **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

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

## Awards

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

**1<sup>st</sup> 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

**3<sup>rd</sup> 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**

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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, 52<sup>nd</sup> 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