KEITH CAROLUS

Buffalo, NY
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EDUCATION

Computer Engineering, Bachelor of Science
University at Buffalo | 2018 (expected)
3.72 GPA

General Education
Jamestown Community College | 2014
3.81 GPA - 53 credits obtained while in high school

EXPERIENCE

University at Buffalo, Department of Computer Science and Engineering
Undergraduate Research Assistant | *September 2017 – Present*

- Developing hardware simulator for custom instruction set architecture based on Digilent Artix-7 FPGA for CSE443: Compilers and CSE490: Computer Architecture

Research Laboratory (undisclosed)
Intern | *May 2017 – Present*

- Developed highly accurate deep convolutional neural networks for SAR imagery classification
- Implemented adversarial example generation techniques, improved model robustness
- Currently writing an IEEE conference paper

Buffalo Neuroimaging Analysis Center
Undergraduate Research Assistant | *February 2015 – Present*

- Develop projects investigating multiple sclerosis pathology via magnetic resonance imaging
- Utilize high performance computing and machine learning techniques
- Developing automated MRI lesion segmentation models
- Characterizing the timeline of Wallerian degeneration
- Tracking lesion progression according to vascular region

Achievements:

- First author of abstract accepted to the American Academy of Neurology Conference 2018
- Recipient of Nvidia academic support grant for graphics processing unit, $1,200
- Recipient of grant, *Convolutional neural network based automated MRI lesion segmentation in multiple sclerosis*, $4,950
- Co-recipient of grant for computer technology in the Kenneth M. Alford Medical Education Center, $2,500
- Co-author of 7 accepted conference abstracts to Neurology, IMSCOGS, ECTRIMS-ACTRIMS
- Co-author of 2 manuscripts

Empire Genomics
ISFTP Fellow | *May 2016 – May 2017*

- Full-stack web development of information management system for cytogenetic testing according to stakeholder requirements, integrated into company intranet (LAMP stack)
- Began developing multiple myeloma bioinformatics project relying on 1,000 patient NIH database with Dr. Jianxin Wang from the University at Buffalo Center for Computational Research

University at Buffalo, Department of Computer Science and Engineering
Undergraduate Teaching Assistant | *September 2015 – Present*

- Support CSE115 and CSE116: Introduction to Computer Science I and II, CSE341: Computer Organization, and CSE379: Introduction to Microprocessors
- Teach weekly recitations and labs with approximately 100 students in attendance to review and assist with projects
- Hold weekly open office hours, provide review sessions, and invigilate examinations

SELECT PROJECTS

- TaDa web app for productivity, a Trello/Google Calendar hybrid (link)
- First Place, UB CS Ed Week Demo competition, Arduino LED connect four with Android Bluetooth controller

TECHNICAL COMPETENCIES

Platforms:	Linux (Ubuntu), Windows, OS X, Android
Languages:	Python, Java, R, C/C++, Javascript, PHP
Frameworks:	Caffe, Tensorflow
Applications:	Eclipse, PyCharm, Android Studio, Microsoft Office
Other:	Jupyter/IPython, Docker, Git, MATLAB, LaTeX, HTML/CSS, SQL, JUnit, MIPS and ARM assembly

PROFESSIONAL ACTIVITIES

- Selected member of University at Buffalo Department of Computer Science and Engineering Undergraduate Student Advisory Board
- Member of the American Physician Scientists Association
- Reviewer, IMPULSE Journal of Neuroscience
- Member of the University at Buffalo Honors College
- Honors Peer Mentor for freshman engineering students
- Recommended and selected for Spark, the University at Buffalo's internationally competitive scholarship and fellowship preparation program
- Member of Computational Sciences Club and the Association for Computing Machinery, participate in skills building workshops and social events including UB Hacking

VOLUNTEERING

Cornell University Cooperative Extension
Mentor | *February 2015 – November 2017*

- Mentor for high risk youth in after school program entitled "Tech Wizards" at the Seneca Babcock Community Center in close proximity to where I live in south Buffalo

PUBLISHED CONFERENCE ABSTRACTS

Keith Carolus, Tom Fuchs, Niels Bergsland, Deepa Ramasamy, Tomas Uher, Dana Horakova, Manuela Vaneckova, Eva Havrdova, Ralph H.B. Benedict, Robert Zivadinov, Michael G. Dwyer. *Accelerated subcortical atrophy following new lesion accrual in directly connected tracts is significant and appears limited to the first year*. American Academy of Neurology (AAN), Los Angeles, CA; April 21-27, 2018.

Tom Fuchs, Ralph HB Benedict, Sanjeevani Choudhery, Xian Li, **Keith Carolus**, Matthew Mallory, Alexander Bartnik, Devon Oship, Faizan Yasin, Deepa Ramasamy, Dejan Jakimovski, Bianca Weinstock-Guttman, Robert Zivadinov, Michael G. Dwyer. *Preservation of Functional Connectivity Moderates the Impact of White Matter Tract Disruption on Cognition in Multiple Sclerosis*. American Academy of Neurology (AAN), Los Angeles, CA; April 21-27, 2018.

Tom Fuchs, **Keith Carolus**, Sanjeevani Choudhery, Dejan Jakimovski, Niels Bergsland, Bianca Weinstock-Guttman, Robert Zivadinov, Ralph HB. Benedict, Michael G. Dwyer. *Whole Brain Tract Disruption Better Explains Cognitive Decline in Multiple Sclerosis than Total Lesion Volume*. ECTRIMS-ACTRIMS, Paris, France; October 25-28, 2017.

Tom Fuchs, **Keith Carolus**, Dejan Jakimovski, Niels Bergsland, Deepa Ramasamy, Bianca Weinstock-Guttman, Ralph HB. Benedict, Robert Zivadinov, Michael G. Dwyer. *Longitudinal association between deep gray matter atrophy and lesion-based disruptions in connected white matter tracts*. ECTRIMS-ACTRIMS, Paris, France; October 25-28, 2017.

Tom Fuchs, Caila Vaughn, Sanjeevani Choudhery, **Keith Carolus**, Dejan Jakimovski, Niels Bergsland, Bianca Weinstock-Guttman, Ralph HB. Benedict, Robert Zivadinov, Michael G. Dwyer. *Lesion-based disruption of connections between the amygdala and surrounding ipsilateral structures may be protective against fatigue in multiple sclerosis*. ECTRIMS-ACTRIMS, Paris, France; October 25-28, 2017.

Tom Fuchs, Michael G. Dwyer, Shumita Roy, Sanjeevani Choudhery, Patrick Rooney, **Keith Carolus**, Niels Bergsland, Deepa Ramasamy, Dejan Jakimovski, Bianca Weinstock-Guttman, Robert Zivadinov, Ralph HB. Benedict. *Associations Between Low Conscientiousness and Cognitive Impairment in MS May Be Due to Shared Pathophysiology: Structural Network Disruption of Frontal Cortex Regions*. ECTRIMS-ACTRIMS, Paris, France; October 25-28, 2017.

Tom Fuchs, Michael G. Dwyer, Shumita Roy, Sanjeevani Schoudhery, Patrick Rooney, **Keith Carolus**, Neils Bergsland, Deepa Ramasamy, Dejan Jakimovski, Bianca Weinstock-Guttman, Robert Zivadinov, Ralph Benedict. *Elucidating the Pathophysiology of Conscientiousness in Multiple Sclerosis: Structural Network Disruption of Frontal Cortical Regions*. International Multiple Sclerosis Cognition Society (IMSCOGS), Dusseldorf, Germany; June 7-8, 2017.

Tom Fuchs, **Keith Carolus**, Ralph HB. Benedict, Niels Bergsland, Deepa Ramasamy, Robert Zivadinov, Michael G. Dwyer. *Subcortical gray matter atrophy is predicted by white matter lesions in directly connected tracts in multiple sclerosis*. American Academy of Neurology (AAN), Boston, MA; April 22-28, 2017.

PENDING JOURNAL PUBLICATIONS

Tom Fuchs, Michael Dwyer, Amy Kuceyeski, **Keith Carolus**, Xian Li, Sanjeevani Choudhery, Bianca Weinstock-Guttman, Dejan Jakimovski, Deepa Ramasamy, Robert Zivadinov, Ralph HB Benedict. *Structural Network Disruption Explains Reduced Conscientiousness in Multiple Sclerosis*. Human Brain Mapping.

Tom Fuchs, **Keith Carolus**, Ralph RH. Benedict, Niels Bergsland, Deepa Ramasamy, Dejan Jakimovski, Bianca Weinstock-Guttman, Amy Kuceyeski, Robert Zivadinov, Michael G. Dwyer. *Longitudinal Impact of New Focal White Matter Damage on Localized Subcortical Gray Matter Atrophy in Multiple Sclerosis*. Multiple Sclerosis Journal.

OTHER

- Comfortable Spanish speaker