

Date Prepared: October 1, 2018

## ***CURRICULUM VITAE***

**V. K. Cody Bumgardner, PhD**  
**Assistant Professor, Clinical Title Series**  
**Department of Pathology & Laboratory Medicine**  
**University of Kentucky College of Medicine**  
**UK HealthCare**

### **I. GENERAL INFORMATION**

**Office Address**           800 Rose St, MS 116A  
  Lexington, KY 40536

**Email**                        [cody@uky.edu](mailto:cody@uky.edu)

**Telephone**                 859-323-7215

### **II. EDUCATION**

#### **Undergraduate**

**Morehead State University**  
  Morehead, KY  
05/1995-05/1996    Pre-Engineering  
  **University of Kentucky**  
  Lexington, KY  
08/1996-05/1999    Philosophy  
05/2003-05/2009    BS, Computer Engineering

#### **Professional/Graduate**

**University of Kentucky`**  
  Lexington, KY  
05/2010-05/2017    PhD in Computer Science

### **III. PROFESSIONAL EXPERIENCES**

**Rowan County Board of Education**  
  Morehead, KY  
05/1994-05/1996    Network Consultant, IT, part-time

**Morehead State University**  
  Morehead, KY  
05/1995-12/1995    Consultant, IT, part-time  
01/1996-08/1996    Physics Co-Op, Mathematics and Physics, part-time

**Pomeroy Computer Resources**

Lexington, KY  
08/1996-12/1997 Systems Consultant, Systems Support, full-time

**Communitronics Inc.**

Lexington, KY  
01/1997-02/2000 Senior Network Engineer/Security Analyst, Systems Engineering, full-time

**Nuvox Communications**

Lexington, KY  
05/2000-09/2001 Senior Technical Manager, Solutions Consulting, full-time

**Netsource**

Lexington, KY  
09/2001-06/2002 Director of Technical Services, Technical Services, full-time

**University of Kentucky**

Lexington, KY  
06/2002-11/2003 Lead Developer, Center for Minimally Invasive Surgery, full-time  
11/2003-01/2008 Lead Systems Programmer, UKIT, full-time  
01/2008-07/2010 Director Enterprise Computing and Development, UKIT, full-time  
07/2010-07/2016 Chief Technology Architect, UKAT, full-time  
07/2016-07/2017 Director of Research Computing, Research Computing, full-time  
07/2016-present Assistant Director, Institute of Biomedical Informatics, full-time  
08/2017-present Director of Informatics, Pathology and Laboratory Medicine, full-time  
09/2017-present Assistant Professor, Computer Science, courtesy joint appointment

**IV. HOSPITAL or CLINICAL APPOINTMENTS**

**University of Kentucky**

Lexington, KY  
Department of Pathology  
Lexington, KY  
08/2017-present Assistant Professor, Clinical Title Series, full-time

**V. CONSULTING ACTIVITIES**

**State/Regional**

**Commonwealth Office of Technology**

Frankfort, Kentucky  
06/2014-09/2014 Cloud Migration Strategy and Procedures in Support of Executive Order 2012-880

## VI. TEACHING ACTIVITIES

### University Faculty

08/2017 - Current      **University of Kentucky**  
Lexington, Kentucky  
Laboratory Information Systems, residents

## VII. ADMINISTRATIVE ACTIVITIES & UNIVERSITY SERVICE

### University

**University of Kentucky**  
Lexington, Kentucky

08/2008-08/2012      **Education & Research**  
Member, High Performance Computing Technical Advisory Committee  
08/2012-08/2014      Chair, High Performance Computing Technical Advisory Committee

08/2017-present      **Community Outreach**  
Co-community lead, US Ignite, Lexington as a Smart City

### College

**University of Kentucky**  
Lexington, Kentucky

08/2011-08/2013      **Administration**  
Chair, UKAT Enterprise Technology Architecture Committee  
08/2013-07/2015      Member, UKAT Enterprise Technology Architecture Committee

08/2014-present      **Education & Research**  
Member, Arts and Sciences Research/Scholarship Committee

## VIII. SPECIAL ASSIGNMENTS

A 20 year career comprised of strategic planning, technical, and leadership roles in the areas of technology architecture, software development, networking, research, systems, and security.

### Skills:

1. Strategic planning: Lead efforts to reorganize infrastructure organization to align with future state cloud computing opportunities. I established a "virtual first - highly distributed" policy for resource acquisition and service delivery, transforming service delivery from a mode of single path failure to a model of high availability. Lead efforts to apply application profiles to

- computational and storage resources, which resulted in higher performance and lower cost, through assigning appropriate resources to projects based on strategic value.
2. Leadership Development: Completed CIO Pathways Leadership Development Program (2011). Graduated the UKIT Leadership Development Program (2010 and 2011). Student supervisor of Kentucky Student Technology and Leadership Program of Rowan County (1995). I have been fortunate to receive ongoing mentoring from highly respected individuals in their fields, in turn I mentor others and actively engage in professional development inside and outside of my organization.
  3. Applications: Extensive experience in the design and deployment of highly redundant systems utilizing application load balancing, virtualization, and cloud services. Deep understanding of all aspects of application development, testing, deployment, and monitoring.
  4. Hardware: Experience ranging from hardware description (HDL and VHDL) through digital/analog circuits to analog power systems.
  5. Network: Extensive experience in network design on the enterprise and carrier level. I have supported and implemented routers, switches, firewalls, content switches/load balancers, and VPN concentrators from most major vendors.
  6. Development: Experience in languages and development practices ranging from machine specific assembly to high level languages.

## **IX. HONORS & AWARDS**

04/2016	Outstanding PhD Student in Computer Science, University of Kentucky
04/2016	Honorable Order of Kentucky Colonels, Kentucky Colonel

## **X. PROFESSIONAL ACTIVITIES, PUBLIC SERVICE & PROFESSIONAL DEVELOPMENT**

### **Memberships**

05/2011-present	Institute of Electrical and Electronics Engineers (IEEE)
05/2011-present	Association for Computing Machinery (ACM)
09/2017-present	Digital Pathology Association (DPA)
08/2018-present	Association for Pathology Informatics (API)

### **Review Panels**

	<b>NSF Panel</b>
06/2015-06/2015	Panelist
04/2018-04/2018	Panelist
	<b>2017 International Conference on Cognitive Infocommunications, Systems and Networks (ICCISN)</b>
02/2017-04/2017	Technical Program Committee: Reviewer

- 04/2017-07/2017 **2017 International Conference on Advances in Computing, Communications and Informatics (ICACCI)**  
Technical Program Committee: Reviewer
- 08/2017-10/2017 **2017 International Conference on Internet of Things, Embedded Systems and Communications (IINTEC)**  
Technical Program Committee: Reviewer
- 02/2018-02/2018 **DoD National Defense Science and Engineering Graduate Fellowship**  
Panelist
- 02/2018-4/2018 **2018 World Symposium on Computer Applications & Research (WSCAR)**  
Technical Program Committee: Reviewer
- 05/2018-10/2018 **2018 International Conference on Information Technology, Information Systems and Electrical Engineering (ICITISEE)**  
Technical Program Committee: Reviewer
- 05/2018-10/2018 **2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI)**  
Technical Program Committee: Reviewer
- 09/2018- **2019 International Conference on Digital Image Processing (ICDIP)**  
Technical Program Committee: Reviewer

### **Media Contributions**

- 01/2012 **SC11**  
Commoditization of Computational Systems, Video, Seattle, WA, SuperComputing (SC) 2011 Staff
- 06/2013 **Storage Switzerland, LLC**  
Growth of Unstructured Data, Video, San Jose, CA, Crump, George
- 06/2013 **InfoQ**  
OpenStack in Action Author Interview, Web, Sergio De Simone

## **XI. SPEAKING ENGAGEMENTS**

### **Local**

- 09/2011 **University of Kentucky Department of Computer Science**  
Lexington, Kentucky  
Keeping Current Seminar: “Current Topics in Cloud Computing”
- 10/2012 Keeping Current Seminar: “Cloud Platform as a Service”

**Intel / Dell**

10/2011  
Lexington, Kentucky  
Converged Computing Conference: “Enabling Scientific Discovery”

**State/Regional**

**Educause**

05/2012  
Tampa Bay, Florida  
Southeast Regional Conference: “Transformation of Student Spaces”

**Commonwealth of Kentucky**

05/2012  
Lexington, Kentucky  
Kentucky CIO Meeting: “Building a Regional Resource Cloud”

**Arista**

10/2016  
Columbus, Ohio  
Networks Cloud Builders: “UK Research Computing”

**Healthcare Information and Management Systems Society (HIMSS)  
Kentucky Bluegrass Chapter - Clinical Informatics Symposium**

09/2018  
Highland Heights, KY  
Panel: “Preparing Infrastructure for Digital Pathology”

**National/International**

**Dell Computer**

06/2011  
Orlando, Florida  
Dell Storage Forum: “Higher Education Computing”

**American Society of Agricultural and Biological Engineers**

08/2011  
Louisville, Kentucky  
International Meeting: “Growing Research Through Hybrid Cloud”

**International Conference for High Performance Computing**

10/2011  
Seattle, Washington  
SC11: “Research and Hybrid Cloud”

**Dell Computer**

04/2013  
Santa Cruz, California  
Dell XL: “Cloud Computing and Virtualization in SuperComputing”

**Dell Computer**

06/2013  
San Jose, California  
Dell Enterprise Forum: “Optimization of Clouds for the Enterprise”

- 08/2014 **Dell Computer**  
Nashville, Tennessee  
Global Summit: “Future of Information Technology”
- 06/2015 **International Workshop on Computer and Networking Experimental Research Using Testbeds**  
Columbus, Ohio  
Panel: “Software Defined Networks (SDN) and Experiment-based Research”
- 09/2015 **Global LambdaGrid Workshop and GLIF Conference**  
Prague, Czech Republic  
IRNC Meeting: “Software-Defined and Privacy Preserving Network Measurement Instrument and Services for Understanding Data-Driven Science Discovery”
- 12/2017 **Windstream Inc.**  
Little Rock, AR  
Windstream Healthcare Team Meeting: “Topics in Pathology Informatics”
- 03/2018 **Healthcare Information and Management Systems Society (HIMSS) Conference**  
Las Vegas, NV  
Panel: “Preparing Your HIT Infrastructure for Digital Pathology and Beyond”
- 07/2018 **70th American Association for Clinical Chemistry (AACC) Scientific Meeting & Clinical Lab Expo**  
Chicago, IL  
Scientific Session: “Beyond the Personal Computer: Moving Analysis to Computational Clusters”

## **XII. RESEARCH & INTELLECTUAL CONTRIBUTIONS**

### **A. PUBLICATIONS**

#### **Peer-Reviewed Original Research in Professional, Scientific or Educational Journals**

1. Gandsas, A, McIntire K, Montgomery K, **Bumgardner V**, and Rice, L. “The personal digital assistant (PDA) as a tool for telementoring endoscopic procedures.” *Medicine Meets Virtual Reality 12: Building a Better You: The Next Tools for Medical Education, Diagnosis, and Care* 98 (2004): 99.
2. Neelakantan S., Mueller T, Lee B, Finnell P, **Bumgardner V. K.C.**, and D. Carey. 2011. Web 2.0 spatial data browser for visualizing land-use assessment information from soil surveys. *J. of Soil and Water Conservation and Management*. 66:37A-39A

3. Mueller, T., Neelakantan, S., Rienzi, E., Mijatovic, B., Castrignano, A., Pike, A., **Bumgardner, V.K.C.** 2012. Cloud Computing, Web-Based GIS, Terrain Analysis, Data Fusion, and Multivariate Statistics for Precision Conservation in the 21st Century.
4. **Bumgardner, V.K.C.**, and Victor W. Marek. "Scalable hybrid stream and Hadoop network analysis system." Proceedings of the 5th ACM/SPEC international conference on Performance engineering. ACM, 2014.
5. **Bumgardner, V. K.** Cody, Victor W. Marek, and Caylin D. Hickey. "Cresco: A distributed agent-based edge computing framework." Network and Service Management (CNSM), 2016 12th International Conference on. IEEE, 2016.
6. **Bumgardner, V. K.** Cody, et al. "Constellation: A secure self-optimizing framework for genomic processing." e-Health Networking, Applications and Services (Healthcom), 2016 IEEE 18th International Conference on. IEEE, 2016.
7. **Bumgardner, V. K.** Cody, Victor W. Marek, and Ray L. Hyatt. "Collating time-series resource data for system-wide job profiling." Network Operations and Management Symposium (NOMS), 2016 IEEE/IFIP. IEEE, 2016.
8. **Bumgardner, V.K.C.**, et al. "An Edge-Focused Model for Distributed Streaming Data Applications", International Workshop on Pervasive Flow of Things (PerFoT'18). IEEE, 2018.
9. **Bumgardner, V.K.C.**, et al. "Edge-enabled Distributed Network Measurement", Second International Workshop on Smart Edge Computing and Networking (SmartEdge'18). IEEE, 2018.

#### **Books, Book Chapters, Monographs**

1. **Bumgardner, V.K.C.**, and Victor W. Marek, Educational Applications of Cloud, Book Chapter Encyclopedia of Cloud Computing, Wiley-IEEE Publication, 2016, Print.
2. **Bumgardner, Vernon.** Open Stack in Action. NewYork: Manning, 2016. Print

#### **Letters, Book Reviews, Lay Press**

1. Van den Berg, Marcel. Managing Microsoft Hybrid Clouds. Birmingham, UK: PACKT, 2015. Print
2. Case Study: HPC tailored to research needs with OpenStack cloud. Austin, TX, Dell Inc, 2017. Print
3. University of Kentucky researchers move massive data loads easily with an SDN-enabled campus network. Palo Alto, CA, HPE, 2017. Print

4. How OpenStack HPC Powers Improvements in Scientific Research. San Diego, CA, HPCwire, 2018. Print

## **B. ABSTRACT PRESENTATIONS**

### **National/International Meetings**

1. Mastrangelo MJ Jr, Sheetz M, **Bumgardner V.K.C**, George I, Mylniec P, Bellinghausen J. 2003. Exhibit: Immersive Real-Time Tele-Collaboration of Complex Volumetric Medical Imaging for Surgical Planning. I2/NLM/ Radiological Society of North America Annual Meeting exhibit Chicago, Illinois. December 2003
2. Beech W, **Bumgardner V.K.C**, Hesse U, Van Horn D, Jaromczyk J, Schardl C. 2006. XGrid Implementation of the InterProScan for the Epichloe festucae Genome Project. Poster session at the International Society for Computational Biology, Fortaleza, Brazil, August 2006
3. **Bumgardner, V.K.C**. 2014. Demonstration of GENI aggregate-based reporting and alerting system prototype. Poster/Demo session presented at the 19th GENI Engineering Conference, Atlanta, Georgia, USA, March 2014.
4. **Bumgardner, V.K.C**. 2014. Podium: Scalable hybrid stream and Hadoop network analysis system. Session on distributed system performance presented at ICPE14, Dublin, Ireland, March 2014.
5. **Bumgardner, V.K.C**. 2014. Podium: Demonstration of GENI aggregate-based reporting and alerting system. Operations session presented at the 21st GENI Engineering Conference, Bloomington, Indiana, USA, October 2014.
6. **Bumgardner, V.K.C**. 2015. Demonstration of multi-level real-time stream reporting system. Demo/Poster session presented at the 22st GENI Engineering Conference, Washington, D.C., USA, March 2015.
7. **Bumgardner, V.K.C**. 2016. Podium: Demonstration of GENI monitoring session. Operations session presented at the 24th GENI Engineering Conference, Tempe, AZ, USA, March 2016.
8. **Bumgardner, V.K.C**. 2016. Collating time-series resource data for system-wide job profiling. Work-shop on Analytics for Network and Service Management presented at AnNet 2016, Istanbul, Turkey, April 2016.
9. **Bumgardner, V.K.C**. 2016. Constellation: A Secure Self-Optimizing Framework for Genomic Processing. Healthcom Conference on E-health Networking, Application & Services, Munich, Germany, September 2016.

10. **Bumgardner, V.K.C.**, et al. 2016. Programmable Privacy-Preserving Network Measurement for Network Usage Analysis and Troubleshooting. Internet2 Technology Exchange, Miami, FL, USA, September 2016.
11. **Bumgardner, V.K.C.** 2016. Cresco: A distributed agent-based edge computing framework. The International Workshop on Green ICT and Smart Networking (GISN 2016), Montreal Quebec Canada, November 2016.
12. Farrar D, Hayes J, Adkins G, Griffioen J, **Bumgardner V.** NetSecOps and Policy Checking. Grand Challenges of Traceability: The Next Ten Years, 2017; p42
13. **Bumgardner, V.K.C.**, Hickey, Caylin, Shapiro, Scott, Cottle, Chad 2017. Cresco Framework: Edge Computing in Smart Cities. Poster session presented at the 2017 Smart Cities Connect Conference and Expo, Austin, TX, USA, June 2017.
14. **Bumgardner, V.K.C.**, Hickey, Caylin, Insko, George, Watkins, Brad 2017. Cresco Framework: Edge Computing in Defense Management. Poster session presented at the 2017 Defense Innovation Challenges, Tampa, FL, USA, October 2017.
15. **Bumgardner, V.K.C.** 2018. Edge-enabled Distributed Network Measurement. International Workshop on Smart Edge Computing and Networking (SmartEdge'18), Athens, Greece, March 2018.
16. **Bumgardner, V.K.C.**, Insko, George, Hickey 2018. Cresco Framework: Edge Computing in Homeland Security. Poster session presented at the 2018 Intelligence, Lexington, KY, USA, April.
17. Luo, Y., Ghinita, G., **Bumgardner, V.K.C.**, McGarry M. 2018. Programmable privacy-preserving network measurement for network usage analysis and troubleshooting. Demonstration presented at Géant TNC18, Trondheim, Norway, June 2018.
18. **Bumgardner, V.K.C.** 2018. Edge framework for resource-aware distributed applications. Poster session presented at Géant TNC18, Trondheim, Norway, June 2018.

## **C. SPONSORED RESEARCH PROJECTS, GRANT & CONTRACT ACTIVITIES**

### **Active**

<b>Project Title:</b>	“IRNC: AMI: Collaborative Research: Software-Defined and Privacy-Preserving Network Measurement Instrument and Services for Understanding Data-Driven Science Discovery”
<b>Project Number:</b>	3048112416
<b>Principal Investigator(s):</b>	V. Bumgardner, PhD
<b>Role in Project:</b>	Principal Investigator/Co-Principal Investigator
<b>Effort:</b>	10 %
<b>Institution/University:</b>	University of Kentucky

**Source of Funding:** NSF  
**Duration of Project:** 04/2015-03/2019  
**Total Award:** \$502,104  
**Grant Number:** IRNC-1450937  
**Project Title:** "MRI: Acquisition of the Kentucky Research Informatics Cloud (KyRIC)"

**Project Number:** 3200000952  
**Principal Investigator(s):** GQ Zhang, PhD  
**Role in Project:** SP  
**Effort:** 10 %  
**Institution/University:** University of Kentucky

**Source of Funding:** NSF  
**Duration of Project:** 08/2016-07/2019  
**Total Award:** \$2,240,000  
**Grant Number:** ACI-1626364

**Project Title:** "GENI Going Forward: Experimenter Tool Support, Operations Monitoring and Reporting"

**Project Number:** 1536090  
**Principal Investigator(s):** J. Griffioen, PhD  
**Role in Project:** Co-Principal Investigator  
**Effort:** 2 %  
**Institution/University:** University of Kentucky

**Source of Funding:** NSF - C.O. Raytheon BBN Technologies Corp  
**Duration of Project:** 04/2016-12/2019  
**Total Award:** \$640,618  
**Grant Number:** CNS-1536090 Subcontract

**Project Title:** "Collaborative Research: CICI: Secure and Resilient Architecture: NetSecOps -- Policy-Driven, Knowledge-Centric, Holistic Network Security Operations Architecture"

**Project Number:** 3200000871  
**Principal Investigator(s):** J. Griffioen, PhD  
**Role in Project:** Co-Principal Investigator  
**Effort:** 2 %  
**Institution/University:** University of Kentucky

**Source of Funding:** NSF  
**Duration of Project:** 09/2016-08/2019  
**Total Award:** \$499,925  
**Grant Number:** ACI-1642134

## Inactive

**Project Title:** "CC\*DNI Networking Infrastructure: An Software Defined Networking-Enabled Research Infrastructure"  
**Project Number:** 3200000225  
**Principal Investigator(s):** V. Bumgardner, PhD  
**Role in Project:** Principal Investigator  
**Effort:** 5 %  
**Institution/University:** University of Kentucky  
**Source of Funding:** NSF  
**Duration of Project:** 10/2015-09/2018  
**Total Award:** \$486,572  
**Grant Number:** CNS-1541380

**Project Title:** "CC-NIE Integration: Advancing Science through Next Generation SDN Networks"  
**Project Number:** 1246332  
**Principal Investigator(s):** V. Kellen , PhD and J. Griffioen, PhD  
**Role in Project:** Senior Personnel  
**Effort:** 10 %  
**Institution/University:** University of Kentucky  
**Source of Funding:** NSF - U. of Kentucky  
**Duration of Project:** 10/2012-09/2015  
**Total Award:** \$997,437  
**Grant Number:** OCI-1246332

**Project Title:** "University of Kentucky Ops Transition (GENI Network Monitoring)"  
**Project Number:** 1346688  
**Principal Investigator(s):** V. Bumgardner, PhD  
**Role in Project:** Principal Investigator  
**Effort:** 10 %  
**Institution/University:** University of Kentucky  
**Source of Funding:** NSF - Subcontract 1939C C.O. Raytheon BBN Technologies Corp.  
**Duration of Project:** 10/2013-09/2015  
**Total Award:** \$254,604  
**Grant Number:** CNS-1346688

**Project Title:** "University of Kentucky Ops Transition (Additional Effort Funding Request for Agreement No. 1939C)"  
**Project Number:** 1346688  
**Principal Investigator(s):** V. Bumgardner, PhD  
**Role in Project:** Principal Investigator  
**Effort:** 2 %  
**Institution/University:** University of Kentucky

**Source of Funding:** NSF - Subcontract 1939C C.O. Raytheon BBN Technologies Corp.  
**Duration of Project:** 07/2015-06/2016  
**Total Award:** \$39,846  
**Grant Number:** CNS-1346688

**Project Title:** "University of Kentucky Ops Transition (Additional Effort Funding Request for Agreement No. 1939C)"  
**Project Number:** 1346688  
**Principal Investigator(s):** J. Griffioen, PhD  
**Role in Project:** Co-Principal Investigator  
**Effort:** 2 %  
**Institution/University:** University of Kentucky  
**Source of Funding:** NSF - Subcontract 1939C C.O. Raytheon BBN Technologies Corp.  
**Duration of Project:** 04/2016-09/2016  
**Total Award:** \$64,528  
**Grant Number:** CNS-1346688

**Project Title:** "GENI Going Forward"  
**Project Number:** 1536090  
**Principal Investigator(s):** J. Griffioen, PhD  
**Role in Project:** Co-Principal Investigator  
**Effort:** 2 %  
**Institution/University:** University of Kentucky  
**Source of Funding:** NSF - C.O. Raytheon BBN Technologies Corp  
**Duration of Project:** 04/2016-03/2017  
**Total Award:** \$258,112  
**Grant Number:** CNS-1536090 Subcontract

#### **D. OTHER CREATIVE ACTIVITIES**

06/2015-present      **Lexington Fayette Urban County Government**  
Cresco (software) for use in Smart City development

#### **XIII. OTHER ACTIVITIES**

03/2014-present      **OpenStack Foundation**  
OpenStack Kentucky Community Leader

04/2015-present      **Docker Inc.**  
Docker Lexington Community Leader

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