Anthony Rios

☎ *859-466-3466*
✉ *anthonymrios@gmail.com*

Research Interests

Machine Learning; Natural Language Processing; Healthcare; Precision Medicine

Education

2012–Degree Expected June 2018 **Ph.D. in Computer Science**, *University of Kentucky*, Lexington, Kentucky.
Advisor: Ramakanth Kavuluru, Ph.D.
Proposed Dissertation Title: Exploiting Label Correlations for Multi-label Text Classification

2007–2011 **B.S. in Computer Science**, *Georgetown College*, Georgetown, Kentucky.

Research Experience

2017 **Summer Research Fellow**, *National Institute of Health (NCBI/NLM/NIH)*, Bethesda, Maryland.

- Developed methods to extract protein-protein and chemical-protein interactions from text with applications to precision medicine.

2013–present **Graduate Research Assistant**, *University of Kentucky*, Lexington, Kentucky.

- Developed multi-label classification methods for biomedical text classification.
- Created a biomedical article search engine based on drug properties.
- Implemented a technique to extract drug-drug interactions from free text

Teaching and Tutoring Experience

Fall 2016 **Guest Lecturer**, *Biomedical Natural Language Processing*, University of Kentucky.
Instructor: Ramakanth Kavluluru, Ph.D.
Convolutional Neural Networks for Text Classification

2010–2011 **Computer Science Peer Tutor**, *Georgetown College*, Georgetown, Kentucky.

Professional Experience

2010–2013 **Software Engineer Intern**, *Lexmark International*, Lexington, Kentucky.

Spring 2010 **Software Engineer Intern**, *Corevalus Systems LLC.*, Georgetown, Kentucky.

Awards

- 2017 – Best poster, Annual Commonwealth Computational Summit
- 2017 – Ranked 1st (among 13 teams; 500 Euro prize) in the BioCreative text mining chemical-protein interactions (CHEMPROT) shared task
- 2017 – Ranked 2nd (among 11 teams) in the shared task on classification of medication intake messages on Twitter for online pharmacovigilance (at Social media mining for health workshop at AMIA)
- 2017 – NIH Intramural Research Training Award (IRTA)
- 2016 – Ranked 3rd (among 24 teams) in the CEGS NGRID shared task on predicting psychiatric symptom severity scores based on clinical notes (RDoC for Psychiatry workshop at AMIA)
- 2016 – Graduate School Travel Grant, University of Kentucky
- 2015 – Thaddeus B. Curtz Memorial Scholarship, University of Kentucky
- 2015 – Best paper nomination, IEEE International conference on healthcare informatics, IEEE ICHI 2015.
- 2015 – Ranked 2nd (among 18 teams), Annual BioASQ Semantic Indexing Challenge, Task A (Batch 2)
- 2014 – Distinguished poster nomination, American Medical Informatics Assoc. (AMIA) Annual Symposium
- 2011 – Outstanding Senior in Computer Science, Georgetown College

Publications

In Preparation

1. **A. Rios**, R. Kavuluru, Z. Lu. Biomedical Relation Classification with Neural Adversarial Domain Adaptation. *In preparation*
2. **A. Rios** and R. Kavuluru. Transfer Learning with Convolutional Neural Networks for Biomedical Text Classification: From MeSH Heading Prediction to Diagnosis Code Assignment. *In preparation*

Peer-reviewed Journal Publications

3. **A. Rios** and R. Kavuluru, Ordinal Convolutional Neural Networks for Predicting RDoC Positive Valence Psychiatric Symptom Severity Scores, Journal of Biomedical Informatics (2017)

4. R. Kavuluru, **A. Rios**, and Y. Lu. An Empirical Evaluation of Supervised Learning Approaches in Assigning Diagnosis Codes to Electronic Medical Records. Artificial Intelligence in Medicine, Volume 65, Issue 2; 2015 May.

Peer-reviewed Conference Publications

5. R. Kavuluru and **A. Rios**. Automatic Assignment of Non-Leaf Medical Subject Headings to Biomedical Articles. Proceedings of the American Medical Informatics Association annual symposium; 2015 November 14-18; San Francisco, CA.

6. **A. Rios** and R. Kavuluru. Analyzing the Moving Parts of a Large-Scale Multi-Label Text Classication Pipeline: Experiences in Indexing Biomedical Articles. Proceedings of the IEEE International Conference on Healthcare Informatics; 2015 Oct 21-23; Dallas, TX. (**Best Paper Finalist**, *the system described in the paper also placed 2nd in the 2nd batch of BioASQ 2015*)

7. **A. Rios** and R. Kavuluru. Convolutional Neural Networks for Biomedical Text Classication: Application in Indexing Biomedical Articles. Proceedings of the 6th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics; 2015 September 09-12; Atlanta, GA.

8. **A. Rios** and R. Kavuluru. Supervised Extraction of Diagnosis Codes from EMRs: Role of Feature Selection, Data Selection, and Probabilistic Thresholding. Proceedings of the IEEE International Conference on Healthcare Informatics; 2013 September 09-11; Philadelphia, PA.

9. **A. Rios**, R. Vanderpool, P. Shaw, and R. Kavuluru. A Multi-Label Classication Approach to Coding Cancer Information Service Chat Transcripts. Proceedings of 26th International Florida AI Research Society conference; May 22-24; St. Pete Beach, FL.

Peer-reviewed Workshop Publications

10. Y. Peng, **A. Rios**, R. Kavuluru, Z. Lu. Chemical-protein relation extraction with SVM, CNN, RNN and ensemble systems. Proceedings of the 6th BioCreative Challenge Evaluation Workshop. October 2017. Bethesda, MD. (**Ranked 1st in the 2017 BioCreative CHEMPROT shared task**)

11. S. Han, T. Tran, **A. Rios**, R. Kavuluru. Team UKNLP: Detecting ADRs, Classifying Medication In-take Messages, and Normalizing ADR Mentions on Twitter. Proceedings of the 2nd Social Media Mining for Health Applications Workshop and Shared Task at AMIA. 2017. (**Ranked 2nd in SMMH Workshop Shared Task at AMIA**)

12. R. Kavuluru, **A. Rios**, and T. Tran. Extracting Drug-Drug Interactions with Word and Character-Level Recurrent Neural Networks. Proceedings of the 5th IEEE International Conf. on Healthcare Informatics, Workshop on Healthcare Knowledge Discovery and Management (IEEE ICHI 2017), pp. 5-12

13. **A. Rios**, R. Kavuluru. Ordinal Convolutional Neural Networks for RDoc Classification. Proceedings of the 2016 CEGS N-GRID Shared-Tasks and Workshop on Challenges in Natural Language Processing for Clinical Data; 2016 November 18; Chicago, IL.

Peer-reviewed Posters

14. R. Kavuluru, **A. Rios**, , Brandon Kulengowski, and Patrick McNamara. A Knowledge-Based Collaborative Clinical Case Mining Framework. Proceedings of the American Medical Informatics Association (AMIA) annual symposium; 2014 November 15-19; Washington, DC. (**Distinguished Poster Nomination**)

Abstracts/Poster Presentations

15. **A. Rios**, R. Kavuluru, Z. Lu. Adversarial Discriminative Domain Adaptation for Extracting Protein-Protein Interactions from Text. Poster to be presented at: 2017 Annual Commonwealth Computational Summit; 2017 October 17; Lexington, KY. (**Best Poster**)

16. E. Carter, **A. Rios**, K. Mann. Sick Jump: Maximizing Vertical Air to Optimize Tricks on a Half-pipe. Kentucky Section of the MAA Annual Meeting, Eastern Kentucky University, 2011

Professional Memberships and Activities

- **Reviewer** Journal of Biomedical Informatics (JBI)
- **Student Member** Association for Computer Machinery (ACM)
- **Student Member** and **Reviewer** American Medical Informatics Association (AMIA)

Talks

- **A. Rios**. Convolutional Neural Networks for Biomedical Text Classification: Applications in Indexing Biomedical Articles, Keeping Current, University of Kentucky, Department of Computer Science 2015 and Lexmark International 2016.
- **A. Rios**. Multi-label Collective Classification, Keeping Current, University of Kentucky, Department of Computer Science 2014.
- **A. Rios**. Data Science Workflow with IPython Notebook, Keeping Current, University of Kentucky, Department of Computer Science 2014.

Open Source Software `https://github.com/AnthonyMRios`

- **bio-cnn** – Released a CNN model for biomedical text classification.
- **pyMetaMap** – Developed a python interface for the widely used named entity recognition tool (MetaMap) by the National Library of Medicine
- **pyClausIE** – Created a python interface for the Open Information Extraction tool (ClausIE)

References

Dr. Ramakanth Kavuluru
Ph.D. Advisor
Assistant Professor
Division of Biomedical Informatics (Dept. of Internal Medicine)
725 Rose Street
Lexington KY 40536-0082
email: ramakanth.kavuluru@uky.edu

Dr. Zhiyong Lu
Collaborator/NIH Fellowship Mentor
Senior Investigator
National Center for Biotechnology Information (NCBI/NLM/NIH)
8600 Rockville Pike
Bethesda, MD 20894
email: Zhiyong.Lu@nih.gov

Dr. Nathan Jacobs
Ph.D. Committee Member
Associate Professor
Computer Science
University of Kentucky
329 Rose Street
Lexington, KY 40506-0633
email: jacobs@cs.uky.edu