DREXEL UNIVERSITY
College of
Computing & Informatics

RETThink@Drexel

RET in Engineering and Computer Science: Machine Learning, Big Data and CS Principles

Drexel Research Experience for Teachers Program funded by the National Science Foundation

Program Details: This is a seven-week summer program that will begin on June 29, 2015 and run through August 14, 2015 with follow up activities held throughout the year. Fellows will work alongside Drexel University College of Computing & Informatics faculty and graduates researching machine learning and big data to prepare material for use in classes based on their experiences.

Location:
Drexel University
The College of Computing & Informatics
3141 Chestnut Street
Philadelphia, PA 19104
Campus map

Dates:
Monday, June 29, 2015 – Thursday, July 2, 2015: Orientation
Monday, July 6, 2015 – Tuesday, August 11, 2014: Research Experience
Friday, August 8, 2014 – RET Project Showcase

Stipend: Teachers will be compensated up to $10,000 for their participation in these programs. They will receive $7,000 for the summer activities and $3,000 for participating in additional events throughout the year, which will culminate in a Spring Showcase. Teachers will also receive an extra $2,000 for new classroom materials based on research experience.

Application Deadline: March 15, 2015

Application Checklist:
___ Application completed
___ Essay Questions
___ Letter of recommendation from your principal or department head verifying your employment and assuring that, with your participation, you will be permitted to transfer experiences into classroom exercises and have appropriate time to prepare these new materials
___ Resume

Please send your completed application, letter of recommendation, and resume to:
Evy Vega
Drexel University
The College of Computing & Informatics
3141 Chestnut Street
Philadelphia, PA 19104
215-895-2669 || ev56@drexel.edu

I. General Information

Name: _____

Home Address: _____

_____

_____

Phone: _____ E-mail: _____

Name of School: _____

School Address: _____

_____

School Phone: _____

School District (if applicable): _____

Grade Level (if applicable): _____ Subject:_____

Years of Teaching: _____ Area(s) of Certification: _____

Please check one of the following. Admission to the program is **not** dependent on citizenship status.

- ☐ citizen
- ☐ permanent resident
- ☐ non-citizen
  - ☐ H1-B Visa.

    Employer_____.
    Do you have authorization to work elsewhere? (Yes/No)
    Please provide a copy of your H1-B Visa and Employment Authorization Card.

  - ☐ Other Visa Type. Please specify _____.

Ethnicity **(optional)**:

- ☐ White/Caucasian
- ☐ Black/African-American
- ☐ Hispanic/Latino
- ☐ Asian
- ☐ Native American
- ☐ Pacific Islander
- ☐ Other

Undergraduate Education

Institution	Degree(s) Earned	Major	Year Earned

Graduate Education

Institution	Degree(s)/Coursework	Major	Year Earned

Describe any research experiences that you have had:

Please describe other professional development workshops or programs in which you have participated.
Ex: Computer Science Teachers Association (CSTA) workshops, ACM's Special Interest Group on Computer Science Education (SIGCSE) conferences, etc.

II. Computer Background

Describe your computing background:
Any formal computing education and/or anything you have done on your own.

Please list any experience you have in programming, including computer programming languages, and if it was learned formally (such as in a class) or independently.
Example: Experience with Java – took a class and wrote programs in my spare time

Please list any experience you have in web development and if it was learned formally (such as in a class) or independently.

Explain how you have used computing in teaching and/or administering your classes.

III. Projects

The following projects are available during this RET program. Please number 1 to 3 in order of preference for the project you want to join (1 being your first choice).

_____**Artificial Intelligence (AI) in Gaming with Dr. Santiago Ontanon**

Artificial Intelligences (AIs) can compete against humans in Real-Time Strategy (RTS) games, such as Starcraft and Company of Heroes. These popular games require players to constantly reason about strategies, tactics, resource management, and scheduling as they are playing. You'll learn of state-of-the-art Game AI algorithms and techniques by participating in, and contributing to, research efforts aimed at developing AIs that can perform better against humans in these RTS games.

_____**Driver Distraction with Dr. Dario Salvucci**

This project addresses driver distraction issues (use of cell phones, navigation devices, etc. while driving) by using computer models that mimic human drivers and develop tools to analyze data for patterns and trends. You'll participate in the analytics and gain hands-on experience with tools that allow you to sketch out ideas for new devices and run tests to assess results.

_____**Histology Image Analysis for Diagnosing Breast Cancer with Drs. David Breen and Mark Zarella**

During this project, you'll contribute to the development of diagnosing breast cancer through automated methods. Researchers have already created algorithms that analyze images to assess the stage and severity of the breast tumors. You will develop and apply software that extracts new geometric features from high resolution histology images and utilizes these features to predict medical attributes of a breast tumor.

_____**Real-time Brain Sensing for Learning Assessment with Dr. Erin Solovey**

By integrating real-time brain input with an intelligent tutoring system, it would be possible to capture a learner's changing cognitive state and adapt the learning experience appropriately. Working toward this goal, this project aims to use machine learning to classify a user's cognitive state during a learning activity, using brain data collected with functional near-infrared spectroscopy, an emerging noninvasive neuroimaging tool. We will develop novel assessment methods of what students have learned and when moments of learning occur and use this as input to an intelligent tutoring system.

_____**Security and Threat Detection in Video On Demand with Dr. Spiros Mancoridis**

This project aims to improve security anomaly detection and threat detection at both the computer network and host levels in Comcast's Video On Demand (VoD) service. The project will also develop metrics to assess and improve the quality of experience (QoE) for VoD users.

_____**Stylometrics with Dr. Rachel Greenstadt**

Stylometry is the form of authorship recognition that relies on language used in a document and it has contributed to literary, historical, and criminal investigation breakthroughs. This project uses artificial intelligence (AI) techniques in order to determine the author of a given text. You will work on a multidisciplinary task that combines computer security and privacy, artificial intelligence, and the digital humanities.

Questions

Please answer the following questions using the back of this sheet or a separate sheet of paper.

1. **Why do you want to participate in the RET program and how do you believe your teaching will benefit as a result of this program?** *(250 word minimum)*

2. **Please read the follow articles about CS Principles.**

   - J. Cuny. "Transforming High School Computing: A Call to Action". ACM Inroads, Volume 3 Issue 2, June 2012. (https://docs.google.com/file/d/0B60yN79VbSzTaUt2NzlvWDhwU2M/edit)

   - O. Astrachan, A. Briggs, "The CS Principles Project". ACM Inroads, Volume 3 Issue 2, June 2012. (http://www.cs.middlebury.edu/~briggs/papers/Briggs-Inroads-June2012.pdf)

   After reading, explain how you might create course materials that incorporate the CS Principles into your own teaching.

How did you hear about REThink@Drexel? ***(Check all that apply)***

___ Colleague

___ Email

___ Flyer

___ Newsletter [If so, what newsletter? _____]

___ Website [If so, what website(s)? _____]

___ REThink Program Participant [If so, who? _____]

___ Other: _____

Do you have any prior commitments during the 2015 program dates you will need to attend? Please list commitments and include dates: