# Henan Zhao

4800 D Westland Blvd, Arbutus, MD 21227 | spzhaohenan@gmail.com | (443)255-5264

## Objective

Seeking for an internship on software engineer

## Education

**University of Maryland, Baltimore County (UMBC)** Baltimore, MD
PhD, Computer Science (GPA: 3.81) Expected: Spring 2018
Coursework: Artificial Intelligence, Machine Learning, Data Science, Computer Graphics, Advanced Operating Systems, Design and Analysis of Algorithms, Advanced Computer Architecture
Thesis: Integrating Information Visualization and Scientific Visualization for Accurate Perception and Pattern Searching

**Nankai University** Tianjin, China
Bachelor of Engineering, Computer Science and Information Security (GPA: 87.5/100.0) Jun. 2012
Thesis: Investigation and Implementation of Robust Image Hash Algorithms

## Technical Skills

**Programming**: C/C++ (proficient), OpenGL (proficient), VTK (working knowledge), Python (working knowledge), MATLAB (working knowledge)
**Development Tools**: Visual Studios
**Softwares**: Microsoft Office (Word, Excel, PowerPoint), ParaView, WinSCP
**Operating Systems**: Windows, Linux (Fedora, CentOS, Ubuntu)
**Others**: Git, CMake

## Experience

- Teaching Assistant, CSEE, UMBC
  - CMSC 436/636 Data Visualization Aug. 2017 - Present
  - CMSC 435/634: Introduction to Computer Graphics Jan. 2015 - May 2015
  - CMSC 313: Computer Organization and Assembly Language Aug. 2013 - Dec. 2013
- Research Assistant, Interactive Visual Computing Lab, UMBC Jan. 2014 - Aug. 2017

## Projects

- Visual Exploration of Quantum Simulations Using Spatial and Non-Spatial Visualizations Jan. 2014 - Present
  - Implement 2D and 3D visualization approaches to detect spatial data patterns of quantum physics simulation results
  - Design and implement interaction techniques for data exploration
  - Use K-Means clustering to classify the data by position, orientation and magnitude
  - Implement 2D hybrid images using FFT, high-pass and low-pass filters
  - Implement contour generation using VTK
  - Implement alpha shapes and 3D meshes using CGAL
  - Use dual depth peeling to optimize the rendering of 3D semi-transparent glyphs
  - Implement a parser for input scripts
  - Collaborate with a physicist and improve the tool based on user's requirement
- Integrated 2D+3D Visualization in Virtual Environment - Class Project Feb. 2017 - May 2017
  - Design and Implement a 2D+3D visualization using C++ and OpenGL in a large and immersive display
  - Design and Implement interactions (navigation and selection) using ray-casting technique by wand
  - Conduct a user study to evaluate the accuracy and speed of 2D+3D visualization compared to 3D-only visualization
- Investigation of the Attributes Related to Crimes: Hospital, Income and Age - Class Project Nov. 2016 - Dec. 2016
  - Preprocess and visualize five datasets from Open Baltimore.
  - Use K-Means and DESCAN clustering to explore the relationships of attributes
- Exploration of Bivariate Encoding for Large-magnitude-range Vector Fields Jan. 2016 - Mar. 2016
  - Implement five glyphs for bivariate encoding of large-dynamic-range data using C++ and OpenGL
  - Conduct a user study to evaluate the accuracy and speed of the five glyphs
  - Analyze the results using GLM model and friedman test in SAS

    - Visualize the results using gnuplot and Python
- Classification and Prediction of Crimes in San Francisco - Class Project Nov. 2015 - Dec. 2015
    - Clean data by removing unnecessary attributes and converting dates to numerical values
    - Visualizing the distribution and proportion of crimes
    - Conduct feature extraction by representing attributes using a vector to avoid bias
    - Classify and predict categories of crimes using SVM
- Distributing the Dictionary of Triplets on a CHORD Ring - Class Project Apr. 2015 - May 2015
    - Implement a system for distributing the dictionary of triplets on a CHORD ring using GO and JSON-RPC
- Exploration of a Novel Encoding Approach for Large-magnitude-range Vector Fields May 2014 - Aug. 2014
    - Design and implement a novel encoding approach for large-dynamic-range data using C++ and OpenGL
    - Conduct a user study to evaluate the accuracy and speed of the approach
    - Analyze the results using GLM model in SAS
    - Visualize the results using Python
- Interactive Manipulation of Tree-Ring - Class Project Nov. 2013 - Dec. 2013
    - Implement As-Rigid-As-Possible shape manipulation algorithm using C++ and OpenGL in Linux
- Interaction Research of Pure Gesture Based on Image Sequences Under the Complicated Background, Institute of Machine Intelligence, Nankai University Apr. 2010 - Apr. 2012
    - Implement the tracing of dynamic gestures using Camshift and Kalman filter in C#
    - Use HOOK to combine gesture input with the computer control instruction

## Publications

1. **Zhao, Henan**, Bryant, Garnett W, Griffin, Wesley, Terrill, Judith E., and Chen, Jian, Validation of SplitVectors Encoding for Quantitative Visualization of Large-Magnitude-Range Vector Fields, IEEE Transactions on Visualization and Computer Graphics, vol. 23, no. 6, pp. 1691-1705, 2017.
2. **Zhao, Henan** and Chen, Jian. Empirical Guidance on Integral and Separable Marker Substrate for Large Magnitude-Range Vector Field Visualization. IEEE VIS/SciVis poster, 2016.
3. Chen, Jian, **Zhao, Henan**, Griffin, Wesley, Terrill, Judith E., and Bryant, Garnett W., Validation of SplitVector Encoding and Stereoscopy for Quantitative Visualization of Quantum Physics Data in Virtual Environments, IEEE Virtual Reality Conference, Poster compendium, 2015.

## Services

- Review: ACM Virtual Reality System and Technology (VRST) 2017
- Review: ACM Virtual Reality System and Technology (VRST) 2015

## Presentations

- Speaker, IEEE VIS, Baltimore, MD Oct. 2016
- Presenter, IEEE VIS, Poster Session, Baltimore, MD Oct. 2016
- Presenter, UMBC50 Demo, Baltimore, MD Sep. 2016

## Honors

- Excellent Undergraduate Scholarship (2nd prize), Nankai University Fall 2011
- National Encouragement Scholarship Fall 2010
- Excellent Undergraduate Scholarship (1st prize) Fall 2009

## Other Activities

- HCIL Annual Symposium, College Park, Maryland May 2016
- CRA-W Grad Cohort Workshop, San Francisco, California Apr. 2015
- Information Science Front Technology Summer School, Beijing, China Jun. 2011