JOHN J VICKERS

WEBSITES
johnjvickers.github.io (personal)
poptcorn.github.io (film data blog)

CURRENT WORK
Shanghai Astronomical Observatory
johnjvickers@gmail.com

EDUCATION

Doktor Rerum Naturalium (PhD) at Universität Heidelberg
Area: Astronomy; Specialization: Galactic Astronomy — Grade: 1.5 / 1.0 (Magna Cum Laude)

Bachelor of Science (BSc) at Rensselaer Polytechnic Institute
Area: Physics; Specialization: Astrophysics — Grade: 3.78 / 4.0 (Magna Cum Laude)

EXPERIENCE

Chinese Academy of Sciences - Postdoctoral Research Fellow Spring 2015 - Present

- Used machine learning techniques (SVM, random forest, AdaBoosted trees, etc.) in the scikit-learn library to compare cleaned observational data to simulations to estimate the birth radii of stars using regression for the purposes of trend analysis and population evolution in the context of a Galactic model.
- Used deep learning (MLP) tools from the Keras library on high dimensional spectroscopic data to classify stellar type and predict metallicity. Used techniques for model selection such as loss curve analysis, grid search and overfitting prevention. Visualized high dimensional data using manifolding techniques such as tSNE.
- Outlier detection of hidden structures in the Milky Way using bayesian modeling and Kolmogorov-Smirnov style tests. Population analysis with model fitting to isochronal data.

Universität Heidelberg - PhD Research Fellow Summer 2011 - Winter 2014

- Stellar identification and selection using simple machine learning (KNN) methods and balancing the precision-recall trade-off. Used the selected sampled to model fit the Milky Way halo using maximum likelihood methods and identify outlier structures.
- Bayesian model fitting to identify outlying hypervelocity stars and calculated their orbits using monte-carlo error analysis via the emcee library to characterize their populations.
- Analyzed quasar proper motion anomalies to provide corrective spherical harmonic fits to widely used databasess of proper motions. Published corrective code on GitHub.

Rensselaer Polytechnic Institute - Undergraduate Researcher Autumn 2007 - Spring 2011

- Geophysics machining for high pressure experimentation. Coded diffusion simulations from scratch in Python.
- Astronomy data analysis working on data cleaning and visualization, signal extraction and population analysis of the Palomar 5 stellar stream using public data collected with SQL and analyzed with Python, NumPy and matplotlib.
- Astronomy public outreach for the MilkyWay@Home BOINC project, providing scientific writing and data visualizations for public consumption.

SIDE PROJECT

poptcorn.github.io is a personal blog where I analyze film data features such as actors, run-time, ratings, etc. The blog is hosted on GitHub Pages using jekyll. Among other things, I have analyzed film trends over time, created an interactive movie recommendation engine using Bokeh, investigated film-maker networks using Gephy, and created word-clouds using simple token analysis.

SKILLS

Python (NumPy, SciPy, scikit-learn, matplotlib, pandas, Keras, emcee, jupyter)
OS (Debian, Fedora, Arch, OSX)
Other Computer Skills (bash, SQL, LaTeX, git, PowerPoint)
Analysis (regression, classification, clustering, maximum likelihood, bayesian analysis, monte-carlo techniques, machine learning, deep learning, model fitting, error analysis, data presentation)

HONORS AND AWARDS

President's International Fellowship Initiative Research Fellowship · National Science Foundation of China Research Funding · LAMOST Research Fellowship · Marie Curie Research Fellowship · International Max Planck Research Student Fellowship · Rensselaer Medalist

PUBLICATIONS

The Lives of Stars: Insights from the TGAS−RAVE−LAMOST Data Set[1]
John J. Vickers & Martin C. Smith (ApJ, Volume 860, Issue 2, article id. 91, 16 pp. 2018)

A Global Correction to PPMXL Proper Motions
John J. Vickers, Siegfried Röser, Eva K. Grebel (AJ, Volume 151, Issue 4, article id. 99, 9 pp. 2016.) bayesian ridge,

LAMOST 1: A Disrupted Satellite in the Constellation Draco[2]
John J. Vickers, Martin C. Smith, Yonghui Hou, Yufei Wang, Yong Zhang (ApJL Volume 816, Issue 1, article id. L2, 5 pp. 2016)

Red Runaways: Hypervelocity Stars, Hills Ejecta and Other Outliers in the F-to-M Star Regime
John J. Vickers, Martin C. Smith, Eva K. Grebel (AJ Volume 150, Issue 3, article id. 77, 16 pp. 2015)

A Stellar Population Synthesis Model for the Study of Ultraviolet Star Counts of the Galaxy
Ananta C. Pradhan, D. K. Ojha, A. C. Robin, S. K. Ghosh, **John J. Vickers** (A&A, Volume 565, id.A33, 13 pp. 2014)

Identifying Blue Horizontal Branch Stars Using the z Filter
John J. Vickers, Eva K. Grebel, Avon P. Huxor, (AJ Volume 143, Issue 4, article id. 86, 9 pp. 2012)

CONFERENCE PRESENTATIONS

European Week of Astronomy and Space Science	2016, Athens, Greece 2017 Prague, Czech Republic
The Milky Way Unraveled By Gaia	December 2014, Barcelona, Spain
Pan-STARRS Astrometry	September 2013, Heidelberg, Germany
Pan-STARRS Science Consortium	January 2011, Honolulu, Hawaii August 2012, Durham, UK
LAMOST Workgroup Meetings	June 2009, Beijing, China April 2016, Beijing, China

[1] full texts are available on my website: johnjvickers.github.io/pages/publications.html
[2] Subsequently featured at http://phys.org/news/2015-12-disrupted-globular-cluster-constellation-draco.html as well as http://aasnova.org/2016/03/04/how-to-spot-a-disrupted-galactic-satellite/