# Mark Yashar

Scientific Computing # Scientific Programming # Data Science # High-Performance Computing # Data Analysis # Physics #

mark.yashar@gmail.com

## Summary

# RESEARCH/EMPLOYMENT OBJECTIVES AND INTERESTS #To obtain a research or related computing position in or near the larger San Francisco Bay Area, California involving technical, scientific, and/or computer skills in the physical sciences, including physics, space and earth sciences, and planetary science, as well as in a wide variety of engineering disciplines. Willing to acquire new computational and theoretical skills as needed. #Interested in the utilization and development of modeling, data science, data analysis, statistical, mining, reduction, and processing algorithms, methods, and techniques in a wide range of possible physical science and engineering disciplines, including physics, space and earth sciences, and planetary science. #Additional interests: scientific computing, data science, modeling, image processing, numerical methods, data visualization, software development. # EMPLOYMENT AND RESEARCH EXPERIENCE #2/12-2/14: Postdoctoral Scholar-Employee, Atmospheric modeling and analysis. Supervisor: I. Fung (UCB) #02/09-2/12: Postdoctoral Research Associate, SKA research and development. Supervisor: A. Kemball (UIUC) #05/06 -12/08 : Research Asst., Dark Energy research. Supervisor: A. Albrecht (UCD) #01/04-01/06: Research Asst., MACHO research project. Supervisor: K. Cook (LLNL) #09/02-05/03: Research Asst., TEXES data processing. Supervisor: M. Richter (UCD) #08/99-08/01: Data Aide, USA data processing and handling. Supervisor: P. Kunz (SLAC) #01/99-5/99: Student Project, HST data analysis. Instructor: A. Cool (SFSU) #9/01-12/08: Reader/T.A. Supervisors: W. Potter, L. Lubin, D. Webb (UCD) # REFERENCES Prof. Inez Fung, Earth and Planetary Science, UCB, (510)-643-9367, ifung@berkeley.edu Prof. Andreas Albrecht, Physics, UCD, (530)-554-2299, ajalbrecht@ucdavis.edu Prof. Athol Kemball, Astronomy/NCSA, UIUC,(217)-333-7898, akemball@illinois.edu David Elvins, Earth & Planetary Science, UCB,(510)-643-8336, elvins@berkeley.edu

## Specialties

COMPUTER SKILLS & EXPERIENCE - Operating Systems: Windows, Linux (Red Hat, Centos, Ubuntu), Mac OS. - Programming Languages & Software Applications: Python, Matlab, C/C++ (including O.O.P.; gdb & ddd debuggers and Eclipse), Common Astronomy Software Applications (CASA), Ferret, Mathematica, Meqtrees, Perl, UNIX shell scripting, Fortran, HTML, IDL, IRAF. - Extensive use of MCMC and Metroplis-Hastings algorithms. - Word Processing: LaTeX, Microsoft Office. - Other: VMware Workstation.

## Experience

**Postdoctoral Scholar-Employee (Department of Earth and Planetary Science) at UC Berkeley**
February 2012 - February 2014 (2 years 1 month)

Research focuses on mesoscale and regional (forward or “bottom-up”) atmospheric transport modeling and analysis of anthropogenic and biogenic carbon dioxide emissions from northern California and the Salt Lake City, Utah area for multi-scale estimation and quantification of atmospheric CO2 concentrations. This work has included extensive use of the Weather Research & Forecasting Model (written mostly in FORTRAN), the WRF-Chem coupled weather-air quality model for atmospheric transport simulations, and the Vegetation Photosynthesis and Respiration Model (WRF-VPRM) biospheric model to simulate CO2 biosphere fluxes and atmospheric CO2 concentrations. One area of focus of this work was to study and gain a better understanding of what effect diurnal varying/cycled CO2 fluxes had on simulated CO2 concentrations (mixing ratios) as compared to time-invariant CO2 flux emissions as a way to assess source and/or sink sampling bias. More information and details are available upon request.  I also installed, compiled, built, and configured WRF, WRF-Chem, and VPRM on a NERSC multi-core supercomputing system and submitted batch job scripts to this system to run the WRF model simulations. In addition to the use of WRF, this work also involved the use of the R statistical scripting language, the NCAR Command Language (NCL), Matlab, Python, Ferret,  (http://ferret.pmel.noaa.gov/Ferret/home), GRADS, and Google Earth (KML and KMZ) for additional pre-processing, post-processing, modification, and visualization of netCDF files. Examples of scripts and plots are attached and/or available upon request.   # WORKSHOPS AND CONFERENCE PARTICIPATION  American Geophysical Union Fall Meeting Moscone Center, San Francisco, CA December 9-13, 2013  Basic WRF Winter Tutorial National Center for Atmospheric Research (NCAR), Boulder, CO January 28 – February 1, 2013  MET WRF Tutorial NCAR, Boulder, CO February 4-5, 2013  Supervisor: Professor Inez Fung, University of California, Berkeley

**Postdoctoral Research Associate  at   University of Illinois at Urbana-Champaign, National Center for Supercomputing Applications (NCSA)**

February 2009  -  February 2012  (3 years 1 month)

Research and development in Square Kilometer Array calibration and processing algorithms and computing with a focus on cost and feasibility studies of radio imaging algorithms (involving extensive use of Python). Memo: “Computational Costs of Radio Imaging Algorithms Dealing with the Non-Coplanar Baselines Effect: I” with A. Kemball (http://www.astro.kemball.net/Publish/files/ska_tdp_memos/cpg_memo3_v1.1.pdf).  This work  has included an evaluation of the computational costs of non-deconvolved images of a number of existing radio interferometry algorithms used to deal with non-coplanar baselines in wide-field radio interferometry. My work with the SKA project has also involved extensive use of Python and C++ and the use and implementation of numerical and imaging simulations in conjunction with the use of the Meqtrees software package (http://www.astron.nl/meqwiki) and the CASA software package (written mostly in C++) to address cost, feasibility, dynamic range, and image fidelity issues  related to calibration and processing for SKA and the dependence of these issues on certain key antenna and feed design parameters such as sidelobe level and mount type. Numerical simulations have included Monte Carlo simulations (written in Python).  Publications: Yashar, M., Kemball, A., 2010, “Computational Costs of Radio Imaging Algorithms Dealing with the Non-coplanar Baselines Effect: I”, TDP Calibration and Processing Group Memo #3,  (http://www.astro.kemball.net/Publish/files/

ska_tdp_memos/cpg_memo3_v1.1.pdf). Kemball, A., Cornwell, T., Yashar, M. , 2009, " Calibration and Processing Constraints on Antenna and Feed Designs for the SKA: I", TDP Calibration and Processing Group Memo #4, (http://www.astro.kemball.net/Publish/files/ska_tdp_memos/CP_Antenna_Feed.pdf). # WORKSHOPS AND CONFERENCE PARTICIPATION SKA Calibration and Processing F2F Group Meeting Hyatt Regency O'Hare Hotel, Chicago, IL January 15, 2010

*1 recommendation available upon request*

**Research Assistant at University of California, Davis**

May 2006 - December 2008 (2 years 8 months)

Carried out a Markov Chain Monte Carlo analysis and exploration of a quintessence dark energy model employing the use of simulated data sets, including, for example, what might be expected from future LSST weak lensing surveys and future SDSS baryon acoustic oscillation surveys, as well as SKA surveys (and involving extensive use of Matlab on a Linux computing cluster) under the direction of Prof. Andreas Albrecht. Published Paper: "Exploring Parameter Constraints on Quintessential Dark Energy: the Inverse Power Law Model," with B. Bozek, A. Albrecht, A. Abrahamse, and M. Barnard. Supervisor: Professor Andreas Albrecht, UC Davis #Publications: Yashar, M., Bozek, B, Albrecht, A., Abrahamse, A., Barnard, M., 2009, "Exploring Parameter Constraints on Quintessential Dark Energy: the Inverse Power Law Model", Physical Review D, 79, 103004 (http://prd.aps.org/abstract/PRD/v79/i10/e103004). Barnard, M., Abrahamse, A., Albrecht, A., Bozek, B, Yashar, M., 2008, "A measure of the impact of future dark energy experiments based on discriminating power among quintessence models", Physical Review D, 78, 043528; 2009, Physical Review D, 80, 129903(E) (http://prd.aps.org/abstract/PRD/v80/i12/e129903). Barnard, M., Abrahamse, A., Albrecht, A., Bozek, B, Yashar, M., 2008, "Exploring Parameter Constraints on Quintessential Dark Energy: the Albrecht-Skordis model", Physical Review D, 77, 103502 (http://prd.aps.org/abstract/PRD/v77/i10/e103502). # WORKSHOPS AND CONFERENCE PARTICIPATION 5th Annual Cosmology in Northern California (CINC '08) Kavli Institute for Particle Astrophysics and Cosmology (KIPAC) Stanford Linear Accelerator Center. 18 April, 2008 4th Annual Cosmology in Northern California (CINC '07) University of California, Davis. 11 May, 2007 Cosmo 2006 International Workshop on Particle Physics and the Early Universe, Granlibakken Conference Center and Resort, Tahoe City. 24 - 29 September, 2006.

**Reader / Teaching Assistant at UC Davis**

September 2002 - December 2008 (6 years 4 months)

Reader, held office hours, and proctored exams for undergraduate and graduate physics courses including classical mechanics, electricity and magentism, mathematical methods in physics, astrophysics,introductory astronomy and cosmology, and quantum mechanics.

**Research Assistant and Participating Guest (LLNL) at UC Davis**

January 2004 - January 2006 (2 years 1 month)

Assisted Dr. Kem Cook at Lawrence Livermore National Lab with research, modeling, and data analysis for the Massive Halo Compact Object (MACHO) project. Assisted in the development and implementation of reddening models and Kolmogorov-Smirnov tests to constrain the locations of micro-lensing source stars and possible lensing objects (MACHOs) in the Large Magellanic Cloud (LMC) and halo of the Milky Way Galaxy. This work involved the use of the following programming languages: Perl, C/C++, Fortran, and Unix Shell scripting. Supervisor: Dr. Kem Cook, LLNL

**Research Assistant at UC Davis**

September 2002 - May 2003 (9 months)

Assisted in processing data of spectra of stars and circumstellar material obtained by the Texas Echelon Cross Echelle Spectrograph (TEXES) for the mid-infrared used with the NASA Infrared Telescope Facility. Data extraction and processing was carried out using Fortran. Spectra were displayed using IDL. The project focused on finding water and OH absorption features in the spectra of nearby stars possessing possible circumstellar disks. Water absorption features in the Earth's atmosphere were taken into account. Supervisor: Dr. Matt Richter, UC Davis

**Data Aide for Group K (Particle Astrophysics) at Stanford Linear Accelerator Center**

August 1999 - August 2001 (2 years 1 month)

Data handling, processing, and archive maintenance on the USA (Unconventional Stellar Aspect) experiment at SLAC. This work included downloading data files from the Naval Research Laboratory (in Washington, D.C.) and processing them to create FITS files for scientist's use locally. The work also included the submission of batch jobs to other computing systems and clusters. Wrote and assisted in writing and developing Perl and UNIX shell scripts for the purpose of automating and expediting many of the data handling, processing, and archive maintenance tasks. Also wrote and copied the raw data files to computer tape cartridges. Assisted in scheduling and setting up USA teleconferences. Some Windows NT support, maintenance, and Desktop administration. Also assisted in maintaining an inventory of Particle Astrophysics Group computer systems, other hardware, and software licenses. Supervisors: Dr. Paul Kunz, Professor Elliott Bloom.

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## Organizations

**American Physical Society**

January 2008 to Present

**American Geophysical Union**

November 2013 to Present

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## Projects

**Independent Study and Self-Directed Learning in Data Science and Scientific Computing (Python, MySQL, etc.)**

2014 to Present

Members:Mark Yashar

Currently engaged in independent study and self-directed learning in data science, scientific computing, and high-performance computing (e.g., MPI) with emphasis in Python and MySQL.  Key reference material:  (1) "Python For Data Analysis--Data Wrangling with Pandas, NumPy, and IPython" by Wes McKinney, 2013 (2)  "A Primer on Scientific Programming with Python", Third Edition, by Hans Petter Langtangen, 2012 (3) http://insightdatascience.com/blog/preparing_for_insight.html (4) http://materials.jeremybejarano.com/MPIwithPython/ (5) Various Coursera course materials (e.g., https://class.coursera.org/ml-005/lecture/preview --machine learning) (6) "Cracking the Coding Interview: 150 Programming Questions and Solutions" , Fifth Edition, by Gayle Laakmann McDowell, 2008-2014. (7) "Kaggle's Getting Started With Python For Data Science" -- https://www.kaggle.com/wiki/GettingStartedWithPythonForDataScience  Here is my attempted solution (python scripts) to a data analyst challenge for an undisclosed company:  http://www.slideshare.net/MarkYashar/companyxdataanalystchallenge-49766582

**Research Project: The Albrecht-Skordis Dark Energy Model**

January 2007 to Present

Members:Michael Barnard, Mark Yashar

I worked with Michael Barnard in regards to his work on the Albrecht-Skordis (AS) dark energy quintessence model. A systematic investigation and conceptual work carried out by Dr. Barnard revealed that there were some numerical problems and issues (but not physical problems) involved in his work on the AS model. The work included an exploration of a smaller parameter space of the AS model, without the need to explore a larger parameter space with MCMC.I assisted in generating 3-dimensional Chi-squared plots that helped us develop intuition into the actual physical behavior of the model -- a better understanding than would have been allowed by running the full MCMC on the larger parameter space. I assisted in developing and writing MATLAB code that gridded out in parameter space the Chi-squared values for each point (i.e., the Chi-squared grid search) and generated corresponding (unusually-shaped) 3-D Chi-squared plots. More information and details available upon request. Published Paper:  Barnard, M., Abrahamse, A., Albrecht, A., Bozek, B, Yashar, M., 2008, “Exploring Parameter Constraints on Quintessential Dark Energy: the Albrecht-Skordis model”, Physical Review D, 77, 103502. Supervisor: Professor Andreas Albrecht, UC Davis

**Student Project: Data Analysis in Astrophysics -- Minimization by the Downhill Simplex Method in Multidimensions**

March 2005 to Present

Members:Mark Yashar

For the final project in a graduate level data analysis in astrophysics course instructed by Professor Christopher Fassnacht, I studied, researched and gave a class presentation on the mutli-dimensional downhill simplex minimization method. The outline of the presentation was as follows: * Introduction and background * Overview of downhill simplex method * Details of method * Example computer code: "Amoeba.f" * Dealing with local minima: "Momentum" * Astrophysical applications/examples (best-fit star formation histories) * References  Some of the materials used to prepare for the presentation and included in the hand-outs to the rest of the class are attached below. More information and details are available upon request.  Prof. Christopher Fassnacht, Physics, UCD, 530-554-2600, cdfassnacht@ucdavis.edu

**Data Analysis in Astrophysics Graduate Course: Various Homework Assignments and Projects**

January 2005 to March 2005

Members:Mark Yashar

This class provided an introduction to issues in error and data analysis in astrophysics (applicable to other physical sciences and engineering disciplines, etc.). Covered topics included: * A review of error analysis and statistics (i.e., propagation of errors; binomial, poisson, and gaussian distributions; covariance and correlation) * Fourier Transforms * Model fitting * Forecasting errors for future experiments via Fischer Matrices * Bayesian methods and techniques * Error estimation via Monte Carlo techniques * Parameter and error estimation via Markov Chain Monte Carlo techniques * Noise calculations in astrophysical measurements * Exposure time calculations  Main textbook used:  - "Numerical Recipes in Fortran 77: The Art of Scientific Computing". 2nd ed. 1992. New York, NY: Cambridge University Press  Additional details and information available upon request.  Course Instructor: Professor Chris Fassnacht (fassnacht@physics.ucdavis.edu).

**Student Project: Computational Physics research project - extrasolar planets and habitable zones**

January 2003 to May 2003

Members:Mark Yashar

For the final project in a graduate level computational physics course instructed by Professor John Rundle, I wrote computer code in Fortran and IDL (available upon request) briefly described as follows: The program computes a closed orbital ellipse of an extrasolar planet orbiting a single star using data input by the user. The program queries the user to enter various orbital and physical parameters of the planet-star system and uses this data to calculate the observed effective equilibrium blackbody temperature of the extrasolar planet for a given orbital phase. The program also calculates the planet-to-star flux ratios at given orbital phases. Plots are also generated showing the shape and size of the orbit, orbital speed vs. orbital phase, planet temperature vs. orbital phase, and planet-to-star flux ratios vs. orbital phase. Finally, the code also gives an indication as to whether the inputs entered meet the criteria for a habitable planet.  Supervisor: Professor John Rundle, University of California, Davis

**Computational Physics Graduate Course: Various Homework Assignments and Projects**

January 2003 to March 2003

Members:Mark Yashar

Various projects carried out in this course are described further below in the 'Projects' Section of my Linkedin profile. The topics covered in this course included the following: * Errors, Uncertainties,Convergence (e.g., analyzing the growth of errors, Taylor series, Gaussian integrals). * Solving linear equations * Numerical differentiation * Numerical integration (quadrature) * Ordinary differential equations * Partial differential equations * Fast Fourier Transform (FFT) * Fitting data  Main textbooks used:  - "The Nature of Mathematical Modeling" by Neil Gershenfeld (1999): Cambridge University Press. - "Numerical Recipes in Fortran 77: The Art of Scientific Computing". 2nd ed. 1992. New York, NY: Cambridge University Press Course Instructor: Professor John Rundle (rundle@physics.ucdavis.edu)

**Student Project: Computational Physics Assignment -- Timing Codes and Procedures**

January 2003 to Present

Members:Mark Yashar

For an assignment in a graduate computational physics course instructed by Professor John Rundle, I wrote, modified, and utilized computer code in Fortran and C to estimate the CPU processing time, cycling time, and user time for different-sized nested loops as well as simple basic math operations (e.g., addition, multiplication, division, square root). More details and information available upon request. Prof. John Rundle, Physics, UCD, (530)-752-6416, rundle@physics.ucdavis.edu

**Student Project: Computational Physics Assignment -- Random Site Percolation**

January 2003 to Present

Members:Mark Yashar

For an assignment in a graduate computational physics course instructed by Professor John Rundle, I studied, utilized, and modified random site percolation (a statistical physics model) code written in Fortran 77. Using IDL, I generated log-log plots of the number of nearest-neighbor site percolation clusters against the size of each cluster for different percolation site occupation probabilities, different numbers of Monte Carlo sweeps (iterations), and different lattice sizes. More details and information are available upon request. Prof. John Rundle, Physics, UCD, (530)-752-6416, rundle@physics.ucdavis.edu

**Student Project: HST Data Analysis**

January 1999 to June 1999

Members:Mark Yashar

I engaged in a laboratory project for an astronomy lab course instructed by Dr. Adrienne Cool (Physics & Astronomy Department, SFSU) in which possible cataclysmic variable (CV) star candidates were identified from light curves and R vs. H-alpha plots using R and H-alpha CCD images taken with the Hubble Space Telescope Wide Field Planetary Camera 2 (WFPC 2) of the central regions of the globular star cluster NGC 6397. IRAF, SAOTNG, and Supermongo software packages were used in the analysis. I also carried out an observational project on variable stars for this astronomy lab course using a 10-inch Epoch Telescope-CCD system and the IRAF and SAOTNG software packages.

**Installed, Configured, and Maintained VMware Workstation 7.1 for Linux**

February 2009 to February 2012

Members:Mark Yashar

While working at NCSA, I installed, configured, and maintained multiple 64-bit VMware (Workstation 7.1) virtual machines (VM) on a host Linux CentOS 5.x system using ISO disk images. Various guest operating systems, including CentOS 5.5 and Ubuntu 9.10, were installed on the newly created VMs. This work also involved using the 'GParted' software package to expand the size of the VM root partition.

**Installed, Configured, and Maintained Liferay Portal Software**

February 2009 to February 2010

Members:Mark Yashar, Bruce Mather

I assisted in installing, configuring, setting up, maintaining, and utilizing Java-based Liferay Portal (https://www.liferay.com/products/liferay-portal/overview) software with Apache Tomcat Server Bundle and MySQL Database on a Linux machine. This work also involved installing and configuring Java Standard Edition (SE) and Java Development Kit (JDK).

**Berkeley DB (XML) Replicated Transactional Application/Database**

November 2011 to January 2012

Members:Mark Yashar

I was able to demonstrate that it was possible to create and successfully run a Berkeley DB master transactional application database (a toy stock quote server in this particular example), along with a corresponding replicated transactional database, with the use of example C++, Python, and Perl code. This work was related to and connected with work on the Combined Array for Research in Millimeter wave Astronomy (CARMA) radio telescope array project (http://www.mmarray.org/). I also worked on a way to add features and lines of code to this example that enabled and implemented database replication with Berkeley DB XML as well (i.e., replication that involved an XML container and XML manager instances, etc..) I attempted to combine example Berkeley DB C++ code for the toy stock quote server with example Berkeley DB XML C++ code that did querying and handled the results using transactions to try to fulfill the goals of our (CARMA) project, which was to create a replicated Berkeley DB XML database and replicated transactions ... In conjunction with all of this, I was able to successfully run and utilize Berkeley DB XML example Perl, Python and C++ code with sample XML data that existed within the installed Berkeley DB XML distribution directory tree structure to carry out a number of transactions and queries on sample XML data. The sample data consisted of a large number of XML data files, and I was able to run Perl, Python, and C++ example code to a create database and DB XML containers and then add all of the sample XML documents (data files) to the containers (*.dbxml files) within the database environment. I was then able to utilize other example Perl, Python, and C++ code to carry out a number of tasks and transactions on the database. More information and details available upon request. Supervisor: Dr. Athol Kembal, NCSA/ UIUC

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## Courses

**M.S., Physics**

San Francisco State University

| | |
|---|---|
| Lasers and Quantum Optics | Physics 715 |
| Observational Astronomy Lab | Astronomy 390 |
| Introduction to Theoretical Physics I, II | Physics 385, 485 |
| Astrophysics | Physics 722 |
| Physics of Elementary Particles | Physics 721 |
| Geometrical and Physical Optics | Physics 340 |
| Statistical Physics | Physics 475 |
| Electromagnetic Theory | Physics 703 |
| Classical Mechanics | Physics 701 |
| Intro to Quantum Mechanics, Quantum Mechanics II | Physics 430, 431 |
| Analytical Mechanics I,II | Physics 330,331 |
| Electricity & Magnetism I,II | Physics 360,460 |

**PhD, Physics**

University of California, Davis

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|---|---|
| Computational Physics | Physics 210 |
| Data Analysis in Astrophysics | Physics 250-2 |
| Quantum Mechanics | Physics 215 A,B,C |
| High Energy Astrophysics & Radiation Processes | Physics 265 |
| Statistical Mechanics | Physics 219A |
| Extra-Galactic Astronomy | Physics 250/267 |
| Ethics for Scientists | Physics 280 |
| Introduction to Mathematica | ECH 198 |
| Mechanics and Electromagnetic Theory | Physics 200A,B,C |
| Cosmology Seminar | Physics 294 |
| Seminar in Physics | Physics 290 |

**B.A., Physics**

San Francisco State University

| | |
|---|---|
| Modern Physics I, II | Physics 320, 325 |
| Thermodynamics and Statistical Mechanics | Physics 370 |
| Stars, Galaxies, and Cosmology | Astronomy 330 |
| Introduction to Astrophysics | Astronomy 420 |
| Intro to Computer Science | CSC 110 |
| Intro to Computer Programming | CSC 210 |
| History of Astronomy | Astronomy 350 |
| The Violent Earth | Geology 302 |
| Violent Atmosphere and Ocean | Meteorology 302 |
| Modern Physics Laboratory | Physics 321 |
| The Solar System | Astronomy 320 |
| Environmental Problems and Solutions | Geography 600 |
| Intro to Critical Thinking I | Philosophy 110 |
| Calculus and Analytical Geometry I,II,III,IV | Math 220,221,222,223 |
| Introduction to Astronomy | Astronomy 115 |
| Astronomy Laboratory | Astronomy 116 |
| Intro to Creative Writing | CW 101 |
| Human Biology | Biology 100 |
| Elementary Differential Equations & Linear Algebra | Math 245 |
| General Physics with Calculus I,II,III | Physics 220,230,240 |
| General Physics with Calculus I,II,III Lab | Physics 222,232,242 |
| Linear Algebra | Math 325 |
| Bioethics | Biology 349 |
| Fundamental Oral Communication | Speech 150 |

| | |
|---|---|
| The Nuclear Revolution | NEXA 340 |
| Intro to Social and Cultural Anthropology | Anthropology 120 |

**Independent Coursework**

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|---|---|
| 2014-Present: Currently engaged in independent study and self-directed learning in data science and scientific computing with emphasis in Python and MySQL. Key reference material: (1) "Python For Data Analysis" by Wes McKinney, 2013, ... | Independent Study |

## Skills & Expertise

**Fortran**
**Physics**
**LaTeX**
**Matlab**
**Python**
**Data Analysis**
**C++**
**Mathematica**
**Astrophysics**
**Linux**
**C**
**Science**
**Monte Carlo Simulation**
**Algorithms**
**Scientific Computing**
**R**
**Unix**
**Numerical Analysis**
**Simulations**
**Shell Scripting**
**Perl**
**Image Processing**
**IDL**
**Astronomy**
**WRF**
**Ferret**
**Research**
**Programming**
**HTML**
**VMware Workstation**

**Emacs**
**Mac OS X**
**Numerical Simulation**
**Eclipse**
**Operating Systems**
**Mac OS**
**Unix Shell Scripting**
**CentOS**
**Ubuntu**
**Red Hat Linux**
**Excel**
**Oracle Berkeley DB XML**
**Java**
**Statistics**
**Mathematical Modeling**
**Modeling**
**Mathematics**
**Software Development**
**MySQL**
**IPython**

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## Publications

**Exploring parameter constraints on quintessential dark energy: The inverse power law model**

Physical Review D   May 7, 2009

Authors: Mark Yashar, Brandon Bozek, Augusta Abrahamse, Andreas Albrecht, Michael Barnard

We report on the results of a Markov chain Monte Carlo analysis of an inverse power law (IPL) quintessence model using the Dark Energy Task Force (DETF) simulated data sets as a representation of future dark energy experiments. We generate simulated data sets for a Lambda CDM background cosmology as well as a case where the dark energy is provided by a specific IPL fiducial model, and present our results in the form of likelihood contours generated by these two background cosmologies. We find that the relative constraining power of the various DETF data sets on the IPL model parameters is broadly equivalent to the DETF results for the w0-wa parametrization of dark energy. Finally, we gauge the power of DETF stage 4 data by demonstrating a specific IPL model which, if realized in the universe, would allow stage 4 data to exclude a cosmological constant at better than the 3 sigma level.

**Computational Costs of Radio Imaging Algorithms Dealing with the Non-Coplanar Baselines Effect: I**

TDP Calibration and Processing Goup Memo #3, v1.1   October 22, 2010

Authors: Mark Yashar, Athol Kemball

We summarize the computational costs in forming dirty images of a number of existing (wide-field) radio interferometry imaging algorithms used to deal with noncoplanar baselines in wide-field radio interferometry, including Fourier Sums, 3-D FFT, facets/polyhedron imaging, w-projection, a hybrid facets and w-projection approach. We will consider computational costs associated with the w-stacking imaging algorithm and deconvolution in a future memo.

## Education

**University of California, Davis**

PhD, Physics, 2001 - 2008

**San Francisco State University**

M.S., Physics, 1999

**San Francisco State University**

B.A., Physics

## Interests

I am interested in the utilization and development of data analysis, statistical, mining, reduction, and processing algorithms, methods, and techniques in a wide range of physical science, computational science, and engineering disciplines.

## Languages

**English**

# Mark Yashar

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mark.yashar@gmail.com


## **1** person has recommended Mark

"Mark is an incredibly kind, hard-working, and knowledgeable research associate. He's detail-oriented, intelligent, and always does everything to the best of his ability. He's passionate about his career in science, technology, and research. Not only does he excel at his job, but his compassion, generosity, and concern for others is second to none. He is an excellent colleague and a wonderful individual. I would highly recommend him for any project, assignment, or job position."

**— Tracy Liao**, *Management Assistant - Human Services Agency, City and County of San Francisco*, was with another company when working with Mark at University of Illinois at Urbana-Champaign, National Center for Supercomputing Applications (NCSA)

Contact Mark on LinkedIn