Curriculum Vitae for Ata Karakci

Personal information

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Born:	25 December 1980	Nationality:	Turkish

Summary

I have a PhD in physics with specialisation in astrophysics and have worked as a researcher at various international institution for over a decade. I have expertise in statistical analysis of big data sets, numerical modelling, signal processing, imaging, and programming together with a demonstrated ability to learn complex material provides me with an excellent foundation for contributing to the development of machine learning and artificial intelligence systems for next generation of big data analysis. I consider myself as a motivated, self-driven, result oriented and creative problem solver with strong analytic skills.

Technical skills

Frameworks	Numpy, Scipy, Astropy, Pandas, Matplotlib, Scikit-learn, ...
Languages	Python, C/C++, IDL/GDL, ...
Tools	Git, Unix, Mac OS X, Jupyter Notebook, Microsoft Office, ...

Education

2008 - 2014	PhD in physics from Brown University, thesis titled "Bayesian Analysis of Systematic Effects in Interferometric Observations of the Cosmic Microwave Background Polarization"
2004 - 2006	Masters in physics from Bogazici University, thesis titled "S-duality in String Gas Cosmology"

Professional experience

2008 – 2014	PhD student, Brown University, Providence, RI. Developed a Gibbs sampling image reconstruction software for interferometric observations of polarised CMB signal. Collaborated in maximum likelihood analysis of systematic errors in microwave interferometers. Taught undergraduate laboratory classes.
2014 – 2014	Visiting researcher, Lawrence Berkeley National Laboratory, UC Berkeley. Collaborated in joint analysis of ground-based BICEP2/Keck Array and satellite-based Planck data. Developed simulations of Galactic microwave emissions.
2014 – 2016	Postdoctoral researcher, Astroparticle and Cosmology Laboratory, Universite Paris VII. Developed simulations of gravitationally lensed CMB signal and extragalactic microwave emissions. Collaborated in developing a PCG based imaging software for CMB polarisation from Planck satellite data. Collaborated in developing a Bayesian source separation method for cosmological hydrogen line signal.
2016 – 2019	Postdoctoral researcher, Institute of Theoretical Astrophysics, University of Oslo. Developed a PCA-based source separation software for CMB signal analysis in spherical wavelet domain. Applied a Gibbs sampling / MCMC method for CMB component separation. Collaborated in constructing a 3D model of the Galactic dust polarisation. Gave lectures and supervised master student projects.
2019 –	Consultant, Expert Analytics

Languages

English	Fluent
French	Intermediate
Norwegian	Intermediate
Turkish	Native

Personal skills

Analytical skills	Strong skills for understanding and formulating the problem in a solvable way.
Bayesian statistics	Parameter optimisation, model selection, Monte Carlo Markov Chains
Creative problem solving	Demonstrated the ability to learn and creative new and complicated material within a reasonable timescale
Machine learning	Regression, classification, support vector machines, K-means clustering, principal/independent component analysis

Some interests and hobbies

Music	Violin
Sports and nature	Running, hiking, mountain biking, skiing

Extended descriptions of selected projects

Activity	Interferometric Gibbs Sampling
Period	2010 - 2014
Role	Researcher
Staffing	Team of 7
Volume	Full time
Description	The project was aimed at detection of B-mode polarization of the cosmic microwave background radiation with a Bayesian inference method for power spectra and signal reconstruction from interferometric data interferometers by using the technique of Gibbs sampling. The validity of the method was demonstrated in the flat-sky approximation for a simulation of an interferometric observation on a finite patch with incomplete coverage, a finite beam size and a realistic noise model.
Tools	Statistical modeling, statistical data analysis, image analysis, MCMC, scientific writing, C++

Activity	A 3-D model of polarised dust emission in the Milky Way
Period	2014 - 2016
Role	Researcher
Staffing	Team of 3
Volume	Full time
Description	The project was aimed at constructing a three-dimensional model of polarised galactic dust emission that takes into account the variation of the dust density, spectral index and temperature along the line of sight, and contains randomly generated small scale polarisation fluctuations. The model is constrained to match observed dust emission on large scales, and match on smaller scales extrapolations of observed intensity and polarisation power spectra. The model was used to investigate the impact of plausible complexity of the polarised dust foreground emission on the analysis and interpretation of CMB polarisation observations.
Tools	Analytical modeling, statistical data analysis, signal analysis, scientific writing, IDL

Activity	Needlet Internal Linear Combination Analysis for CMB Data
Period	2016 - 2019
Role	Researcher
Staffing	Independent project in a mid-size international collaboration
Volume	Full time

Description	The project was aimed at developing a Principal Component Analysis based source separation software for CMB signal analysis in spherical wavelet domain from multi-frequency observations while minimizing the contamination from instrumental noise. The method performs localized analysis in both harmonic space and pixel space via needllet decomposition and as such it adapts component separation to local conditions of contamination both over the sky and over angular scale, and it uses not only spectral information, but also spatial information of the non-Galactic components in order to disentangle the CMB from the Galactic signal and noise contamination.
Tools	Signal processing, source separation, numerical modeling, statistical data analysis, image analysis, scientific writing, python