

# HANNAH R. MARLOWE

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[HRMarlowe.com](http://HRMarlowe.com)

## EDUCATION

**University of Iowa**

*May 2016*

Ph.D. in Physics

**Agnes Scott College**

*May 2011*

B.A. in Astrophysics

## EXPERIENCE

**Credit Research Analytics and Modeling - Innovation Lab**

*June 2017 - Present*

*Senior Economist*

*Fannie Mae*

- Performed analysis to determine leading causes of fall-out from the Single Source Validation service and used results to propose a lender dialogue enhancement to DVS, eventually materialized as the Income Reconciliation API.
- Technical Analytics Lead for the Income Reconciliation API, responsible for: developing and validating business logic; designing the input and response payloads and interactions between the API and lenders, and with internal VDRS and DVS systems; leading a test team to validate logic implementation and functionality; interfacing with lender partners to optimize their use of the service.
- Credit Analytics representative monitoring migration of archival data from the Fannie Vault Hadoop environment to Amazon S3. Leading efforts to ensure data completeness and accessibility for analytics users, and to migrate workflows and validate query performance using Amazon Elastic MapReduce (EMR).
- Developed MapReduce process to support the Trusted Appraisal Underwriting (TAU) service by retrieving and parsing employment and income information from the DU loan application stored in Fannie Vault for the monthly post acquisition review process.
- Developed and maintain daily batch audit process to produce income and asset validation instrumentation results for all submissions to DVS.
- Developed and maintain an automated process to pull daily usage reports from Google Analytics and push them to a Netezza audit table to drive analytics and reporting of the Collateral Underwriter service.

**Credit Research Analytics and Modeling - Innovation Lab**

*April 2016 - June 2017*

*Economist*

*Fannie Mae*

- Performed Proof-of-Concept machine learning image recognition analysis of appraisal images using the recently launch Amazon Rekognition service to label images with identified objects and scenes.
- Analytics lead for the Single Source Validation service which performs automated income and employment validation as part of the Desktop Underwriter Validation Service (DVS).
- Developed Hadoop MapReduce work-flows to extract insights from unstructured underwriting data stored in the Fannie Vault, including process to extract never previously available closing disclosure data for research on fair lending practices.
- Onboarded and trained analysts to access data in the Fannie Vault Hadoop cluster using MapReduce jobs and HBase shell queries.
- Developed method of automatically identifying and attributing income streams from bank transaction data and estimating gross income to validated borrower reported income (patent: us 15/700,908 ◊ filed 09/11/2017).

**Development and characterization of off-plane X-ray diffraction gratings for space applications**

May 2014 - April 2016

*Graduate Research Assistant*

*University of Iowa*

- Developed a Python GUI to interface with PCGrate-SX and perform scans over realistic ranges of groove profile variations to predict and display diffraction efficiencies.
- Worked with an international team to characterize the performance of the first aligned off-plane reflection grating and silicon pore optic spectrograph at the Max Planck Institute for extraterrestrial Physics PANTER beamline.
- Designed and carried out a study of the polarization sensitivity of off-plane x-ray reflection gratings utilizing the Physikalisch-Technische Bundesanstalt beamline at the BESSY II synchrotron facility.

**Development of a Negative Ion Time Projection Polarimeter Instrument for Transient X-ray Sources**

May 2012 - May 2014

*Graduate Research Assistant*

*University of Iowa & Goddard Space Flight Center*

- Collaborated with NASA Goddard Space Flight center to develop and test a Negative Ion Time Projection Chamber (NITPC) polarimeter for transient X-ray sources.
- Designed and constructed a vacuum system and housing for the NITPC including external electronics and power supplies interfaces. Optimized detector lifetime with various gas fill mixtures using Residual Gas Analyzer analysis. Developed Python and Matlab programs to interpret detector signals and improve parameter determinations from photoelectron track morphology.
- Instrumental in execution of several synchrotron beamline test campaigns for NASA's proposed Gravity and Extreme Magnetism (GEMS) polarimetry mission at Brookhaven National Labs to characterize energy and drift dependent polarimeter response.

**Deputy Manager of the Bragg Reflection Polarimeter team for the NASA Gravity and Extreme Magnetism Mission**

July 2011 - May 2012

*Graduate Research Assistant*

*University of Iowa*

- Characterized gain, field uniformity, and lifetime characteristics of the BRP multiwire proportional counter (MWPC) instrument utilizing varying materials, geometries, and assembly techniques.
- Demonstrated imaging capabilities of the MWPC detector and prototype electronics using collimated X-ray source and analysis code written in Python.

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## TECHNICAL SKILLS

Python (NumPy, SciPy, Matplotlib, Scikit Learn, Keras, Pandas)

JAVA, Perl, MATLAB, SAS, Hadoop MapReduce, Oracle PL/SQL

Amazon Web Services including Lambda, EC2, RDS, S3, Rekognition

Unix, Windows, Git, SVN, Excel, PowerPoint, L<sup>A</sup>T<sub>E</sub>X, Microsoft Word

Modeling and statistical analysis

Applications of machine learning techniques for data analysis

Hardware/Software integration

Design and testing of radiation detectors for space applications

Design and operation of vacuum systems

CAD modeling in SOLIDWORKS and Pro E

Private Pilot (airplane, single-engine, land)

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## AWARDS AND FELLOWSHIPS

**NASA Earth and Space Science Fellowship**

2013, 2014, 2015

**William A. Calder Award in Astronomy and Physics - Agnes Scott College**

2011