

Anthony J. Ford

CONTACT INFORMATION	HC-03 Box 53995 Arecibo, PR 00612 USA	<i>Mobile:</i> +1-956-561-3041 <i>E-mail:</i> ford.anthonyj@gmail.com <i>WWW:</i> ajford.us
RESEARCH INTERESTS	Radio astronomy hardware and instrumentation, pulsar astronomy, digital signal processing, and public outreach.	
SOFTWARE INTERESTS	Open source development, Web Applications, User Interface design, Python, and embedded software.	
EDUCATION	The University of Texas at Brownsville , Brownsville, TX USA BMS, Physics and Computer Science, Fall 2008 - 2013 - Incomplete <ul style="list-style-type: none">• Faculty Mentor: Dr. Fredrick Jenet• Senior standing, 120 hours completed• Concentration in Radio Astronomy and Computer Science	
HONORS AND AWARDS	ARCC Scholar	Fall 2008 - Spring 2011 Recipient of the Arecibo Remote Command Center Scholars scholarship, a competitive Honors Physics program.
WORK EXPERIENCE	Arecibo Radio Observatory - Electronics Department	Fall 2013 - Present Receiver and IF/LO Specialist <ul style="list-style-type: none">• Primary duties involved design of new control systems, development of control software, maintenance of existing RF system, characterization of RF systems using various RF test equipment.• Projects:<ul style="list-style-type: none">• Radar Web Log (2015) Web based data entry system for Planetary Radar Group, Python/jQuery/CSS• HF Phase Synthesizer Control System (2015) AVR based digital controller with Python and GTK based GUI• Cryogenics Monitoring and Control (2014) Python based Web App and monitoring system with JavaScript plotting system for data exploration• 12m Up/Down Converter Control System (2013) Python based Web App to control RF signal hardware over socket communications• Also participated as a Mentor in the NSF Research Experience for Undergraduates program, summer of 2015

RESEARCH
EXPERIENCE

Arecibo Observatory

June 2012

Visiting Student Researcher

- 12m VLBI Reference Antenna First Light Team

ARCC at Univ. of Texas at Brownsville

2006 - Summer 2013

Student Researcher/ARCC Scholar, Dr. Fredrick Jenet

- Low Frequency All Sky Monitor Analog Development - 2011-Present
- CARA Request Tracker - 2012
- ARCC Very Small Radio Telescope Project - 2011
- NanoBench Project Leader - 2010
- Chief Observation Scheduler - 2010
- Google App Engine Project Leader - 2009
- Designed AutoSched System - 2009
- Google Sky Pulsar Plug-in Project Leader - 2009
- Assisted in writing Observing Guides - 2008-2010
- Wrote 13th Gravitational Wave Data Analysis Workshop Registration Site - 2008

National Radio Astronomy Observatory - Charlottesville Site Summer 2010

REU Student Researcher, Ron DuPlain

- Exploration and Visualization of Pulsar Survey Data - 6/2010-8/2010
- 2010 REU Overview available [here](#)

PROJECTS

Planetary Radar Group Web Log

2015

The Radar Web Log is a Python web application for, an online data entry and database system for the Planetary Radar Group. The back end is based on Flask, the SQLAlchemy ORM, and the WTForms HTML form library. The front end is based on HTML 5 and CSS (along side Bootstrap 3), jQuery for UI, and the PDFKit javascript library to generate printable PDFs for hardcopies of the log entries.

HF Phase Synthesizer Control System

2015

The HF Phase Synth Control System is an Arduino based digital controller with a Python and GTK based GUI for user control. The decision for an Arduino was driven by the ease of modification for the technicians in the department. The digital controller drives status lines and controls the DACs that drive the RF phase modulation. The Python based GUI issues commands to the RF systems to drive the correct phase modulations needed for the Arecibo Observatory's Ionospheric Heating Facility.

Cryogenics Monitor and Control System

2014

The Cryogenics Monitor and Control System is a Python based monitoring back end that records various system parameters to a PostgreSQL database, and a Python web application for data visualization and exploration. The monitoring and control portion of the system communicates with industrial Acromag ModBus controllers to retrieve sensor values, then records the values in a database for later access. The web application is based on the Python Flask web framework and a jQuery UI with the Flot.js plotting library.

Low Frequency All Sky Monitor

Jan. 2011 - Present

The Low Frequency All Sky Monitor, or LoFASM, is a geographically distributed set of phased-array systems based on technology developed by the [Long Wavelength Array](#). When complete, the system will contain four stations, one each in Port Mansfield, Texas, Socorro, New Mexico, Green Bank, West Virginia, and Fort Irwin, California. Each station consists of 12 LWA-style antennas, phased together

into two concentric rings of 6 antennas using analog combiners. The combined signals then travel back to the electronics shelter where they enter the LoFASM Analog Receiving System, or ARX. The then passes onto a DSP back-end based on the Collaboration for Astronomy Signal Processing and Electronics Research Reconfigurable Open Architecture Computing Hardware.

The ARX was my primary area of work, and consists of three amplification stages, two sets of variable attenuators, and three selectable filters. It is based on SMT electronic components, and was assembled and tested by me.

SOFTWARE
PORTFOLIO

CARA Request Tracker

April 2012

Custom web app based on the idea of a helpdesk ticketing system crossed with an issue tracker.

- Based on Flask, Flask-WTF, Flask-Sendmail, Flask-SQLAlchemy, and others.

Flask-WTF

September 2012 - Present

Simple integration of Flask and WTForms. Originally written by Dan Jacobs

- Current maintainer

Flask-Sendmail

April 2012 - Present

Flask Extension to simply interfacing with Sendmail

- Originally written for CARA Request Tracker, but extended to an extension for benefit of others
- Meant to be compatible with Flask-Mail, an SMTP interface

**Rio Grande Valley's Regional Science and Engineering Fair
Online Registration Site**

September 2008 - Present

Online registration system to bring the RGV Science Fair into a new era. Previously all registration was done by paper and brought in to the coordinator's office (which could be up to a 50 mile round trip).

- Have written the Online Registration for the RGV RSEF since 2008.
- Was originally PHP4 based, but has moved to Python/Flask since 2011.

TEACHING
EXPERIENCE

The University of Texas at Brownsville, Brownsville, TX USA

Computer Programming Workshop, ARCC Program Enrichment
August 10th-15th 2009

- Designed curriculum for a one week C++ primer for incoming ARCC Scholars

Student Research Leader, Astronomy Ambassadors Outreach Program
June 2009

- Lead a group of four students in research on my project "ARCC Pulsar Plug-in for Google Sky" during the 21st Century Astronomy Ambassadors program run by ARCC.
- Two students continued research and presented their work at the 215th AAS conference in Jan. 2010 (See Publications).

Student Instructor, Pulsar Search Collaboratory - Green Bank Radio Observatory
July 2008

- Helped instruct students in rating Pulsar Candidates from the Green Bank Radio Telescope 350MHz Drift Scan, data processing techniques for Pulsar Searching, and supervising other daily activities.

Student Research Leader, Astronomy Ambassadors Outreach Program

June 2008

- Assisted in the Astronomy Ambassadors program run by ARCC.
- Helped instruct students in rating Pulsar Candidates and in data processing techniques.

Student Research Leader, Astronomy Ambassadors Outreach Program

June 2007

- Assisted in the Astronomy Ambassadors program run by ARCC.
- Helped instruct students in rating Pulsar Candidates and in data processing techniques.

JOURNAL
PUBLICATIONS

F. A. Jenet, D. Fleckenstein, A. Ford, A. Garcia, R. Miller, J. Rivera, K. Stovall.
"Apparent Faster-Than-Light Pulse Propagation in Interstellar Space: A new probe of the Interstellar Medium" *Astrophysical Journal*
arXiv:0909.2445

CONFERENCE
POSTERS

Ford, A. and Jenet, F. and Craig, J. and Creighton, T. D. and Dartez, L. P. and Hicks, B. and Hinojosa, J. and Jaramillo, R. and Kassim, N. E. and Lunsford, G. and Miller, R. B. and Murray, J. and Ray, P. S. and Rivera, J. and Taylor, G. B.. "Progress on the Low Frequency All Sky Monitor", *221th American Astronomical Society Meeting Abstracts*, Jan 2013, Poster #345.17
SOA/NASA ADS:2013AAS...22134517F

Rivera, J. and Ford, A. J. and Jenet, F. A. and Stovall, K. and Cohen, S. C. and Dartez, L. and Garcia, Jr., A. and Hinojosa, J. and Longoria, C. and Lunsford, G. and Mata, A. and Miller, R. B. and Reser, J. S. and Hicks, B. C. and Kassim, N. E. and Ray, P. S. and Taylor, G. B.. *The Low Frequency All Sky Monitor for the Study of Radio Transients: Prototype Hardware Development*, 219th American Astronomical Society Meeting Abstracts, Jan 2012, Poster #422.35
SOA/NASA ADS:2012AAS...21942235R

Alejandro, Jr., G. and Jenet, F. A. and Demorest, P. and Stairs, I. and Stovall, K. and Ford, A. J. and Miller, R. B. and Rivera, J. and Rivera, J. and Dartez, L. P. and Martinez, J. G. . '*Faster-than-Light*' *Pulse Propagation in the Interstellar Medium and Evidence for Birefringence*, 219th American Astronomical Society Meeting Abstracts, Jan 2012, Poster #237.10
SOA/NASA ADS:2012AAS...21923710A

Stovall, K. and Jenet, F. A. and Siemens, X. and Ford, A. J. and Garcia, A. and Miller, R. and Rivera, J. and Ceballos, F. and Dartez, L. and Flores, M. and Kayal, K. and Martinez, J. and Rodriguez-Zermeno, A. and Miller, A. and Creighton, J. and Kaplan, D. and Clayton, J. and Biver, C. and Day, D. and Flanagan, J. and Rohr, M. and Hinojosa, J. and Leake, S. and Mata, A. and Cohen, S. and Murray, J. and Reser, J. and Rudnick, P. and PALFA Consortium and GBNCC Consortium. *Pulsar Search Results from the Arecibo Remote Command Center*, 219th American Astronomical Society Meeting Abstracts, Jan 2012, Poster #237.07
SOA/NASA ADS:2012AAS...21923707S

Stovall, K. and Jenet, F. A. and Ford, A. and Miller, R. and Garcia, A. and Rivera, J. and Dartez, L. and Ceballos, F. and Martinez, J. and Kayal, K. and Flores, M.

and Leake, S. and Hinojosa, J. and Zermeno, A. and Miller, A. and Siemens, X. and Creighton, J. and Clayton, J. and Day, D. and Biwer, C. and PALFA Consortium and Mata, A.. *Pulsar Search Results from the Arecibo Remote Command Center*, 217th American Astronomical Society Meeting Abstracts, Jan 2011, Poster #336.12
SOA/NASA ADS:2011AAS...21733612S

Garcia, Jr., A. and Ford, A. and Rivera, J. and Jenet, F. and Stovall, K. and Nice, D. and PALFA Consortium. *Timing of J1917+1736*, 215th American Astronomical Society Meeting Abstracts, Jan 2010, Poster #453.23
SOA/NASA ADS:2010AAS...21545323G

Rivera, J. and Dartez, L. and Ceballos, F. and Garcia, A. and Ford, A. and Stovall, K. and Wren, C. and Jenet, F. and PALFA Consortium. *The Little App that Could*, 215th American Astronomical Society Meeting Abstracts, Jan 2010, Poster #453.07
SOA/NASA ADS:2010AAS...21545307R

Ford, A. and Benavides, R. and Garcia, L. and Miller, A. and Miller, R. and Jenet, F.. *ARCC Pulsar Plug-in for Google Sky: A Pulsar Outreach Tool*, 215th American Astronomical Society Meeting Abstracts, Jan 2010, Poster #453.06
SOA/NASA ADS:2010AAS...21545306F

Stovall, K. and Jenet, F. A. and Cantu, S. and Ceballos, F. and Dartez, L. and Flores, M. and Ford, A. and Garcia, A. and Kayal, K. and Martinez, J. and Miller, R. and Rivera, J. and Srygley, K. and Miller, A. and Zermeno, A. and Siemens, X. and Creighton, J. and Anholm, M. and Clayton, J. and Price, L. and Blemberg, M. and Falk, R. and Fleischmann, Z. and Wierzbinski, A. and PALFA Consortium. *Pulsar Search Results from the Arecibo Remote Command Center*, 215th American Astronomical Society Meeting Abstracts, Jan 2010, Poster #453.05
SOA/NASA ADS:2010AAS...21545305S

Jenet, F. and Ford, A. and Garcia, A. and Miller, R. and Rivera, J. and Kevin, S.. *Apparent Faster-than-light Pulse Propagation In Interstellar Space: A New Probe Of The Interstellar Medium*, 215th American Astronomical Society Meeting Abstracts, Jan 2010, Poster #388.02
SOA/NASA ADS:2010AAS...21538802J

Stovall, K. and Fleckenstein, D. and Ford, A. and Garcia, A. and Miller, R. and Rivera, J. and Jenet, F.. *Pulsar Search Results from the Arecibo Remote Command Center*, 213th American Astronomical Society Meeting Abstracts, Jan 2009, Poster #436.07
SOA/NASA ADS:2009AAS...21343607S

PRESENTATIONS

"LoFASM Progress: Site Installation and ARX Control Software,"
Nov 30th, 2012 Semester Research Presentation

"LoFASM Development: Analog Components," Jan 20th, 2012
Semester Research Presentation

"CAMEL and the P-LoFASM: Progress in Instrumentation," May 17th, 2011
Semester Research Presentation

"First Steps: ARCCs First Foray into Instrumentation," Jan 21st, 2011
Semester Research Presentation

"Exploration and Visualization of Pulsar Survey Data," Aug 11th, 2010
NRAO Research Presentation

"NanoBench: The NanoGrav Toolbench," May 14th, 2010
Semester Research Presentation

"ARCC Confirmation Of Two New Pulsars," December, 2009
Semester Research Presentation

"Google Sky Pulsar Plug-in," May, 2009, Semester Research Presentation

"From the Dish to the Disk ," December, 2008, Semester Research Presentation

SERVICE

Recent contributor to several open-source software projects, including:

- RGVRSEF Rio Grande Valley Regional Science and Engineering Fair's Online Registration Suite
- Personal projects archived at <http://github.com/ajford>

Brownsville's Python User Group

- Co-Founder - 2012

HARDWARE AND SOFTWARE SKILLS

Analog and Digital Electronics:

- AVR Mega series microcontrollers, Basic FPGA programming, amplifiers, simple filters
- Computer-Aided Design Tools: Cadsoft's Eagle, KiCad

Computer Programming:

- Python, JavaScript, HTML, PHP, C++, BASH, SQLite3, MySQL, PostgreSQL, MATLAB, IDL

Version Control Software:

- Git and Mercurial

Information/Internet Technology:

- Apache, SQL, POP, IMAP, SMTP, WSGI-based Web Applications

Productivity Applications:

- L^AT_EX, Markdown, reStructuredText and Vim

Operating Systems:

- Linux, Apple OS X, and Microsoft Windows family

REFERENCES AVAILABLE TO CONTACT

Dr. Fredrick A. Jenet (e-mail: fredrickajenet@gmail.com)

- Professor, Department of Physics and Astronomy, University of Texas at Brownsville
- Director, Center for Advanced Radio Astronomy, University of Texas at Brownsville
- ★ *Dr. Jenet is my undergraduate advisor.*

Dr. Richard Price (e-mail: rprice.physics@gmail.com)

- Professor, Department of Physics and Astronomy, University of Texas at Brownsville
- ★ *Dr. Price was my first physics professor, as well as one of the members of the ARCC Executive Committee.*