Personal

Christopher W. Smith
US Citizen

Email: smith@terminallabs.com
Phone: (512) 920 - 3141

Summary

I am a Python Developer. I worked on a variety of projects across a wide breadth of domains, spanning finance and mass media to particle physics. My strongest skill is analysis and enjoy applying it liberally. I am based in Austin, TX, and worked for clients all over the United States. When I was younger, I intended to be a research Physicist. While I have a great passion for physics, I do not share that passion for academia. If you have challenging, meaningful projects that are critical to the success of your business, I'm your man.

SKILLS

Physics:

Astrophysics, Cosmology, Stellar Structure, Stellar Evolution, High energy processes, Plasma Dynamics, General Relativity, Condensed Matter Physics.

Propulsion Systems:

Modeling of variable specific impulse thrusters for the purpose of mission planning and exploration of high energy processes for use in future high energy density propulsion systems.

Modeling of Various Electric Propulsion Systems:

Ion thrusters, Resistojets, parallel and coaxial Pulsed Plasma thrusters, Electromagnetic thrusters, Pulsed Electromagnetic thrusters, Magnetohydrodynamic thrusters

--Modeling done using Mathematica

Lab Skills:

Analysis of micro scale optical data from Scanning Electron Microscope, metallurgical analysis with Mössbauer Spectroscopy, experience working with high fluence lasers, soldering, simple circuit analysis, use of

oscilloscopes, volt/ohm meters, micro depth polishers, chemical preparation, Polymerase Chain Reaction preparation “from scratch,” Polychromide gel electrophoresis, Calibration testing of micropipettes, Organism specific auger preparation, Experience with handling and disposal of highly acidic and caustic chemicals, low temperature materials (~70K), electrically active systems, and radioactive materials

Miscellaneous:

Networking, Finance, Patent Law, Securities Law, Software Licensing.

Computer Science/ Programming:

Full-stack Development, Python Development, Python Optimization, Linux Application Development, Database Development and Administration, Server Administration, Algorithms, Pair Programming, Computational Complexity Theory, Data Compression, Encryption, TNO (Trust No One) data storage design, and Data Security.

Programming Languages:

• Python	8 years
• Bash	7 years
• SQL	6 years
• Wolfram Language (Mathematica)	3 years
• Fortran 95	3 years
• C	1 year
• Lisp	1 year
• JavaScript	2 years
• Go	< 1 year

Computer Hardware:

- I have personally assembled, repaired, and upgraded many computers. I make it a point to assemble servers and workstations that I use “from scratch” as the situation provides.

terminallabs.com smith@terminallabs.com 512-920-3141

- Experience with Raspberry Pi and Arduino platforms.
- Digital potentiometers, relays, accelerometers, Digital to Analog conversion, some Oscilloscope usage.
- I have installed network infrastructure and equipment for clients. This includes:
  installing wireless Internet systems, configuring routers, running / terminating cable, setting up multiple monitor workstations, building racks and rack-mountable servers, configuring multi-boot systems.

Operating Systems:

Linux, Debian, Ubuntu, Redhat, CentOS, ClearOS, BackTrack Linux, DSL, OS X, OpenBSD, FreeBSD

Databases:

MySQL, PostgreSQL, SQLite, CouchDB, Memcached, Elasticsearch, Solr

Web Servers:

Nginx, Lighttpd (compiled and run “from scratch”)

System Administration / DevOps:

iptables, OpenVPN, OpenSSL, OpenSSH, ufw, Xen (compiled and run “from scratch” for GPU passthrough), AWS (EC2, S3, Cloudfront, Route53), Rackspace, KVM, VirtualBox, Chef, Libcloud, nmap, Wireshark / Ethereal, Metasploit, Bind9, Vagrant, Salt, Puppet

Python Web Frameworks:

Django, Flask, Lektor, Tornado

Other Noteable Python Packages:

NetworkX, PyInstaller, PiCloud, PIL / Pillow, argparse, BeautifulSoup, Scapy, NumPy, ctypes, Jupyter, RPi, locust**:**

Version Control:

Git, Mercurial, Subversion -- Bitbucket, Github, JIRA, Review Board

terminallabs.com smith@terminallabs.com 512-920-3141

WORK EXPERIENCE

- Python Consultant ---------- 2008 – present
  Led the implementation of advanced technologies, worked with a range of clients, facilitated development projects, designed and installed server/networking gear, interacted with UI/UX designers/design firms, developed projects "from scratch," inherited projects midway through development, spent a large amount of time researching emerging technologies, and written a copious amount of code.

- UAH Physics Senior Capstone Project ---------- 2007 – 2008
  Created a theoretical model for the super nuclear density neutron star core. Neutron stars are predicted to have a core that is denser than the nucleus of an atom. There are no generally accepted models for physical interactions at these densities. I created a model for the neutron star core that takes this into account by assuming that the core of the neutron star core is a gas of microscopic black holes. It was shown that there is a mass and density of microscopic black holes for which Hawking radiation allows for there to be an equilibrium between the radiation pressure and the gravitational potential of the black holes in the gas and the outer mass of the neutron star.

- Worked at UAB CORD as Assistant Lead Facilitator ---------- Summer 2006
  Designed experiments to teach teachers and approximately 100 middle school students in summer programs for Environmental Engineering and Molecular Biology. Taught teachers to safely conduct experiments involving Sulfuric Acid and Sodium Nitrite to produce Sulfur Dioxide to depict effects of Nitrites on organic material.

- Worked in Ablative Laser Propulsion lab at UAH ---------- 2005 – 2006
  Studied effects of deflagration vs. detonation in various ablative mediums. Assisted in conducting Schlieren imaging of mediums during laser ablation.

terminallabs.com smith@terminallabs.com 512-920-3141

- Senior Research Internship at University of Alabama at Birmingham ----- Summer 2005

  Measured elastic modulus of various micro carbon / glass balloon from composite materials with destructive and nondestructive methods. Studied scanning electron microscope micrograms various samples, some destructively analyzed. Research was funded by Los Alamos National Labs.

terminallabs.com smith@terminallabs.com 512-920-3141

PROFESSIONAL PROJECTS

PYTHON CONSULTATION PROJECT

Cox Media Group ---------- June 2014 – July 2016

Cox Media Group, a subsidiary of Atlanta-based Cox Enterprises, is an integrated broadcasting, publishing and digital media company. The company operations include 15 broadcast television stations and one local cable channel, 86 radio stations, four metro newspapers, more than a dozen non-daily publications and more than 100 digital services. The company operates one of the largest productions deployments of Django in the world.

Technologies used:

Python, Django, Django-South, jQuery, Ubuntu, HTML5/CSS3, Git, Virtualenv, Vagrant, Less, Grunt, JIRA, Review Board, BeautifulSoup, JavaScript, jQuery, New Relic, Selenium, Jupyter.

My involvement included:

- Developed for the Medley CMS used by the Austin American Statesman (Austin, TX), the Atlanta Journal and Constitution (Atlanta, GA), the Dayton Daily News (Dayton, OH), and the Palm Beach Post (Palm Beach, FL). The Medley CMS is used by hundreds of content producers and Medley sites are viewed by millions of users across the country.
- Helped successfully achieve launch goals of the JP2 in the Fall of 2014.
- Worked as a Full Stack developer for the Newspaper Teams working on the Janus Redesign Project - JP2; a redesign of medley that was deployed in late 2014
- Working in a large team with dozens of other Python and Web Developers, QA Analysts, and Business Representatives
- Worked with performance team to decrease page load times, page load time perception, and otherwise optimize user experience from a performance perspective. New Relic was used to generate granular metrics and identify specific pain points. We saw a 600% decrease in page load time during our with this team.
- Helped the Quality Assurance (QA) analysts by picking up some of their workload when backlogged.
- Backported security updates from current Django source to CMG's custom Django fork.

- Discovered and worked to fix a broad spectrum of inconsistencies with the existing database schema and django models.
- Converted PNG/PDF webpage design mock-ups files into fully functional interactive HTML5/CSS3/Less/JS based web pages and UI features.
- Provided general code maintenance and refactoring.
- Created new Django HTML templates which were rendered into new customer facing webpages.
- Worked with clients automatic ad serving systems to rearrange how and where certain ads were included in customer facing webpages.
- Worked with HTML5/CSS3/Less/JS to make many small improvements to the look and feel of customer facing webpages.
- Worked with Virtualbox and Vagrant to setup multiple VM guests for testing/development and other various uses.
- Worked with Adobe Analytics tools to add statistics gathering instrumentation to the CMG's online assets.
- Fixed many bugs; fixes ranged from small visual problems to complex backend issues.
- Wrote documentation for internal code and systems as well as additional documentation and usage summaries for third party products.

PYTHON CONSULTATION PROJECT

NCN Technology ---------- March 2014 – May 2014

Advanced Business Software Consulting, LLC dba NCN Technology, is an SBA 8a Certified Business specializing in Information Technology Services for web, mobile and SharePoint application development projects.

Technologies used:

Python, Scapy, Metasploit, Ubuntu, Virtualenv, JIRA

My involvement included:

- Worked as a DoD contractor on a US Air Force project to create security vetting tools for iphone apps.
- Wrote a MITM proxy to inspect encrypted iphone traffic over WiFi.
- Wrote scripts to look for XML injection, SQL injection, shell injection, vulnerabilities in iphone app source code.

terminallabs.com smith@terminallabs.com 512-920-3141

PYTHON CONSULTATION PROJECT
modavanti.com ---------- March 2013 – June 2014

A New York based E-commerce company that sells sustainable fashion from around the world. They bring an element of environmental and social awareness to the runway.

Technologies used:

Python, Django, Django-South, jQuery, Rackspace, Elasticsearch, Ubuntu, Chef, HTML5/CSS3, Git, Mercurial, Virtualenv, Gearman, SimpleJSON, authorize.net, Fabric, Memcached, curl, supervisor.

My involvement included:

- Reworked how product images are downloaded from the Rackspace CDN.
- Worked with Elasticsearch to enhance how customers search for products.
- Worked with Rackspace's API to their CDN in order to batch upload image files.
- Worked with the Python Gearman client to create worker scripts that were deployed to the background worker server.
- Revised the project documentation to better describe how to perform a full-stack restart/cloud infrastructure transfer.
- Worked with Virtualbox to set up multiple VM guests for testing/development and other various uses.
- Supported the client's cloud infrastructure both the production VMs and the staging VM.
- Maintained the Supervisord configuration that controlled the Gearman background worker processes.
- Worked with autherize.net Python API to create Modavanti virtual currency
- Worked with UPS Python API
- Used Chef to deploy worker servers.

PYTHON CONSULTATION PROJECT
mobiusmed.com ----------June 2013 – December 2013

Mobius Medical Systems offers innovative software for modern radiation oncology. Specifically, they offer a products that helps Medical Physicists analyze radiation treatment plans for accuracy. Intensity modulated radiation therapy allows for radiation to more selectively target cancer cells. However,

plan error tends to increase with modulation. To fully leverage modulation plan error must be controlled as much as possible.

Technologies used:

Python, CouchDB, PyCUDA, NumPy, Flask, Genshi, Foundation, jQuery, Coffee-Script, couchdb-python, HTML5/CSS3, Selenium, PhantomJS, Git, couchable, Virtualenv, VMware, Xen.

My involvement included:

- Worked with CouchDB to create new MapReduce views to distill data.
- The client wanted to be able to access Nvidia GPU cards from a virtual machine. I set up VMware, ESX, ESXi, VSphere, and Xen for a round of experiments to configure VT-d based PCI passthrough.
- Ported an algorithm originally written in NumPy to C, to be called in Python via ctypes.
- Refactored code to reduce memory usage redundancy in NumPy array objects.
- Added in product features by working with Python Flask views, Genshi templates and HTML5/Javascript.
- Worked with PhantomJS to reconfigure the DPI resolution of exported PDF files.
- Made many aesthetic and UI interactivity changes to the project code.
- Worked with Selenium to create a Python module that could be used to run UI tests against the HTML5 interface.
- Refactored aspects of how data is stored and retrieved to/from CouchDB.
- Moved and created python functions that forked off as child processes to run in the background.
- Created a forked process monitoring module that gathers performance statistics (including memory usage, cpu-time, wall-time) of each child process and stores this data into CouchDB.
- Wrote unit tests using the unittest Python module and Selenium for several product features.
- Built a dedicated GPU server
- Created Flask views to accommodate one off Photon and Electron dosage absorption.

terminallabs.com smith@terminallabs.com 512-920-3141

PYTHON CONSULTATION PROJECT

agyield.com ---------- January 2012 – March 2013

agyield.com offers a very useful tool for risk management for farmers that allows them to understand the costs and risks related to their crops in order to keep track of and project profit scenarios.

Technologies used:

Python, Django, AWS, MySQL, Ubuntu, Mercurial.

My involvement included:

- Collaborated with the CEO and CTO of the company that offers the agyield.com service to understand and revise the development roadmap.
- Performed a broad review of the client's technical operations.
- Worked with AWS to help maintain the client's productions servers.
- Studied commodities trading and crop insurance.
- Worked with the client's ETL systems that regularly downloaded and processed data purchased from a third party.
- Modified how and when emails were programmatically sent.
- Interpreted various properties of features, options, and crop insurance types to correct algorithms that calculated ROI.
- Optimized and refactored crop insurance calculation functions in Python.
- Ran a security audit on their stack.

terminallabs.com smith@terminallabs.com 512-920-3141

SIDE PROJECTS

OPEN SOURCE PROJECT

terminallabs.com ---------- 2011 - Present

terminallabs.com is our own company website. Through it we have taken the opportunity to use several technologies. Though we have a fairly simple website, the body of work that supports our website continually evolves. As much as our time allows, we habitually use this to experiment with new technologies and methodologies, while striving to maintain ease of maintainability. Currently, our website is using the Lektor as a CMS, Framework, and Static Site Generator.

The work is open source and can be found here:
https://bitbucket.org/terminal_labs/tl-lektor

Technologies used:

Python, Django, Mezzanine, Flask, Lektor, AWS (EC2, S3, Cloudfront, Route53), DigitalOcean, Vagrant, Salt Stack, Jira, Bitbucket, Git, Mercurial, Postgres, Debian, Buildbot, Jinja, Less, jQuery

My involvement included:

- Iteratively developing the frontend codebase working with HTML5/JS/LessCSS and Django or Jinja templates
- Iteratively developing the Python server backend with Django / Mezzanine / Flask. This included creating models changes, views, and modifying the CMS for altering content in admin.
- Using Lektor as a web-framework and static site generator and hosting this static site over AWS S3 & Cloudfront with SSL.
- Maintaining multiple code repositories in Mercurial and Git.
- Creating a repository that heavily uses Vagrant and Salt Stack to create and manage both development and production environments on either AWS or DigitalOcean. With a simple `vagrant up` with a couple optional arguments you can spin up local or cloud-based dev instances or cloud-based production instances.
- Used locust with selenium to do load testing against our deployment.

terminallabs.com smith@terminallabs.com 512-920-3141

OPEN SOURCE PROJECT

Inflation ---------- 2017 - Present

Inflation is a tool that allows you to simply orchestrate and provision a cluster. It is built on top of **Rambo** (listed below). With Inflation you can with a couple commands you can create a variable number of virtual machines. This cluster can either be local on a powerful enough computer or created with cloud based virtual machines such as Digital Ocean Droplets or AWS EC2 instances. The cluster is easily configured to have subsets of VMs created and provisioned differently for specialized purposes, so subsets may have varying hardware and configured with different software, all networked together for powerful parallel computing.

The work is open source and can be found here:
https://github.com/terminal-labs/inflation

Technologies used:

Python 2 & 3, Bash, DigitalOcean, Vagrant, Rambo, VirtualBox, SaltStack, Hadoop, HDFS, Ambari, Spark, Dask, Pandas, Jupyter, Distributed, Docker, Ubuntu, Yarn.

My involvement included:

- Created virtual machines on DigitalOcean & VirtualBox.
- Configured inflation to install Hadoop with Hortonworks Ambari.
- Configured inflation to install Hadoop HDFS.
- Wrote Jupyter notebooks that ran on a Hadoop Edge Node to distribute data storage and computation, using Anaconda Dask and Distributed, Pandas, and Hadoop HDFS.
- Used Jupyter's Magic to use HDFS to import data and in situ configuration of Edge Nodes.
- Imported ~100 GB of data from a Digital Ocean Volume onto HDFS and processed it with Python.
- Cycled clusters repeatedly.
- Created a 64 node Hadoop cluster, and a 120 node general cluster.

terminallabs.com smith@terminallabs.com 512-920-3141

OPEN SOURCE PROJECT

Rambo ---------- 2015 - Present

Rambo is a tool that allows you to simply provision new virtual machines on any provider and have them be nearly identical. To accomplish this Rambo makes heavy use of Vagrant and it's various plugins for different providers. As a design philosophy, we really want to have development environments that are as similar as possible to production environments. This streamlines development, catches bugs, and helps smooth production releases. So to achieve this, we wanted to automate the provisioning of these environments. For this we used SaltStack. Among other things, SaltStack is great for provisioning machines. With it, we can provision a local or remote instance pretty easily.

The work is open source and can be found here:
https://github.com/terminal-labs/rambo

Technologies used:

Python, Bash, AWS EC2, DigitalOcean, Vagrant, VirtualBox, LXC, Docker, SaltStack, Jira, Bitbucket, Git, Mercurial, Postgres, Debian.

My involvement included:

- Worked with numerous Vagrant plugins each from different developers and organization with different design philosophies.
- Created virtual machines on AWS EC2, DigitalOcean, VirtualBox, & LXC
- Worked with complex SSH key vendor and authentication systems.
- Maintaining multiple code repositories in Mercurial and Git.
- Smoothed out many inconsistencies between several different cloud providers.
- Created SaltStack configurations with over 50 salt states and custom grains.
- Worked with LXC on Ubuntu 16.04.
- Wrote documentation and tested against its instructions.

terminallabs.com smith@terminallabs.com 512-920-3141

OPEN SOURCE PROJECT
Terminal Labs IRC Server ---------- 2011 - Present

I setup and deployed the in house Terminal Labs IRC server and bouncer. I compiled ratbox IRC and configured it to use our wildcard cert for validated SSL only operation. I also deployed ZNC bouncer to use alongside it (also using validated SSL.)

Technologies used:
AWS, EC2, Bind9, Route 53, Ubuntu, gcc, openssl, ircd-ratbox, ZNC

OPEN SOURCE PROJECT
Digital Potentiometer Demo ---------- March 2017

A simple demonstration for introducing others to use of the raspberry pi's GPIO pins. The project involved writing Python to control a digital potentiometer that modulated the voltage on a led; effectively a digitally controlled light dimmer. GPIO pins are used to power the chip and the voltage supply for the potentiometer wiper. It is also used to send serial instructions to the potentiometer. I also soldered together an oscilloscope from a kit and used it to study the output from the potentiometer. I presented my work to the North Austin Gadget Hackers group in April of 2017.

The work is open source and can be found here:
https://bitbucket.org/smitty42/you-do-drone-on/src

Technologies used:
Python, Bash, RPi, Raspbian, Raspberry Pi, MCP4131 chip, Voltmeter, oscilloscope

terminallabs.com smith@terminallabs.com 512-920-3141

PYTHON DEMONSTRATION PROJECT

Developed PiCloud/iPhone pi distribution statistics app ----- April 2013 – March 2013

This nice iOS app is a simple demonstration of calling the PiCloud cluster via an iPhone app. From the app, the user can search for an inputted string in several billion digits of the decimal expansion of Pi.

Technologies used:

Ubuntu Server, Apache Cordova, PiCloud, Flot Chart, OS X, Xcode, Python Tornado, Nginx, HTML5/CSS3, jQuery, Mercurial.

My involvement included:

- Developed a functional backend server in Python Tornado for receiving/processing AJAX data send from the iPhone app.
- Studied and worked with PiCloud and their API in order to become proficient with their environment.
- Configured a Nginx server to support the “mockup viewer”.
- For this project we needed to test on physical iOS devices, so I used multiple developer tools from the Apple ecosystem (iOS provisioning portal, app signing, physical device deployment)
- Wrote backend code to compute statistics on substring distribution.

terminallabs.com smith@terminallabs.com 512-920-3141

EDUCATION

- 2005 - 2008
  Studied Physics and Astrophysics at the University of Alabama in Huntsville Bachelors of Science program. My Senior research project was a theoretical model for Neutron star cores that attempts to account for their super nuclear density.

PATENTS ISSUED

- High Specific Impulse Superfluid and Nanotube Propulsion Device, System and Propulsion Method.
  - Patent 8,991,150. 31 Mar. 2015.
- Web Insulation System, Valve for a Web Insulation System, and a Storage Container Using the Web Insulation System.
  - Patent 8,991,636. 31 Mar. 2015.
- Apparatus and Method for Anonymously Presenting Targeted Advertisements and Desirable Media Content in Association with a Virtual Currency.
  - Patent 9,001,979. 7 Apr. 2015.
- Web insulation system, valve for a web insulation system, and a storage container using the web insulation system (continuation).
  - Patent 9,279,540. 8 Mar. 2016.

AWARDS AND ACCOMPLISHMENTS

- Member of the American Institute of Aeronautics and Astronautics (AIAA) Nuclear & Future Flight Propulsion Technical Committee (NFFPTC)
- Member of Alpha Lambda Delta honor society
- Participant in UAH honors program
- UAH Zahn Research Scholar
- Participant in NASA Athena Student Interns Program
- Member of NASA's Mars Student Teacher Advisory Panel
- College of Science Dean's List 2007
- College of Engineering Dean's List 2008
- Recipient of Zahn scholarship for physics 2005, 2006
- Recipient of UAH Presidential Scholarship 2005-2009

ORGANIZATIONS THAT I BELONG TO

- American Institute of Aeronautics and Astronautics

terminallabs.com smith@terminallabs.com 512-920-3141

Programs & Tools That I Have Experience With

Software Programs:
- AutoCAD
- Emacs
- GIMP
- Mathcad
- Mathematica

Misc Tools:
- 7-Zip
- Clonezilla
- Genshi
- Jinja
- Git
- Mercurial
- Subversion
- GParted
- Grunt
- jQuery
- Lastpass
- Less
- PhantomJS
- Virtualenv
- Locust
- Selenium
- Gearman
- SpinRite
- TrueCrypt
- Unix Utils (ssh, rsync, awk, grep, ...)
- Conda
- Miniconda

Amazon Web Services (AWS):
- S3
- EC2
- AWS CLI
- Route 53
- CloudFront
- Certificate Manager

Python Frameworks and Python Tools
- BeautifulSoup
- Django
- Django-CMS
- Flask
- Lektor
- Jinja2
- Jupyter
- Lazythumbs
- Mezzanine
- PiCloud
- PIL
- PyInstaller
- PySide

Operating Systems:
- Apple OS X
- CentOS
- ClearOS
- Damn Small Linux
- Debian
- Fedora
- FreeBSD
- Linux Mint
- Ubuntu

Web Apps:
- Bitbucket
- Github
- Google Drive / Docs
- Jira
- Pivotal Tracker
- Redmine
- Review Board

Database Systems:
- CouchDB
- Elasticsearch
- Memcached
- MySQL
- PostgreSQL
- SQLite

Servers:
- Lamp
- Lighttpd
- Nginx

Compilers:
- F95
- g95
- GCC
- Shed Skin

DevOps:
- Fabric
- OpenVPN
- SaltStack
- Vagrant
- VirtualBox
- VMWare
- Xen
- Puppet
- Docker
- Kubernetes

Platforms and Analytics:
- Adobe Analytics
- Adobe DTM
- New Relic
- Omniture
- Rackspace
- Digital Ocean

terminallabs.com smith@terminallabs.com 512-920-3141