

Christopher M. Sharp

Scientific Software Engineer & Consultant

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Summary:

I am particularly interested in keeping abreast with new technologies, both server-side and client-side, in fields such as the graphical visualization of data, especially for scientific and engineering applications. Recently I upgraded to Java 9, and integrated it with the latest version of the Eclipse Oxygen IDE that supports Java EE, and have just started evaluating Webswing as a possible alternative to Vaadin.

My skill set includes software development in SQL and non-SQL databases, Hibernate, Spring, C/C++, and web related coding and scripting in HTML5, CSS3, PHP, JavaScript, SVG, and Angular. I also have many years developing code in FORTRAN, and know how to interface it with C/C++ and Java, which could be made use of in handling legacy code.

Also of real importance is ensuring that code is suitably documented. I have published material in peer reviewed scientific journals and laboratory reports, as well as helping authors on some technical details with their manuscripts.

My specific experience and interests in software development also include, but are not limited to:

- **Server-side programming:** Experience with JSF 2.2 and PrimeFaces with the Glassfish and JBoss web servers, including the Oracle, MySQL and SQLite databases, and RESTful services.
- **Client-side programming:** Experience with various combinations of: WebGL, JOGL, Java FX (including integrating it with Swing and AWT), HTML5, CSS3 (including Grid layout), JavaScript, ThreeJS, jQuery, Angular 1.x, Angular 2+ (with TypeScript), Node.JS, Express.JS, MongoDB, SVG. Some working examples are included with <https://cs-cubed.com/physics/diatomic.html> and <https://cs-cubed.com/jsfsvg/clocks-calen.html>.
- **Reverse engineering and rewriting code:** In some cases undocumented or poorly documented code has to be reverse engineered and sometimes rewritten in another language.
- **Algorithms and Mathematics:** Examining algorithms for computer graphics, such as Quaternions and general n-order Bézier curves, Bessel functions used for frequency modulation, Fourier transforms, Cepstral analysis, etc.
- **Geolocation:** Google Maps API for some possible future mobile applications.

Employment, Consulting and Other Work:

Initiative work, Tucson, Arizona:

Current

Working on projects that may bear fruit on a freelance basis in the future.

- A contact invented a device which he wants to sell online. I suggested that his pictures could be replaced or supplemented by interactive 3D graphics based on his CAD files. Some preliminary work has been performed in animating .stl files using Three.js and WebGL on a web server.
- Java code has been developed to perform astronomical and geometric calculations to determine the relative output power for solar panels for any orientation at any location. Work is now in progress to incorporate this into a JSF2.2 application.

Charity work, Tucson, Arizona:

Apr. 2016 – Current

Web developer and graphics consultant

- Interested in some voluntary charity work, and have put together some test web pages that make use of HTML5, CSS3, SVG, and JSON, one such example is at <https://cs-cubed.com/hellopigey/>. I am also working with Adobe Photoshop and InDesign.

B6 Sigma, Inc., Santa Fe, New Mexico:

Feb. 2015 – May 2015

Scientific software consultant

- Some preliminary investigations into integrating Java with VTK in C++ for the 3D graphical representation of data for 3D metal printing used for the aerospace and defense industry.

Ecole Normale Supérieure de Lyon, France:

Extended visits between Jan. 2007 and May 2014

Frontend and Backend Scientific Web Developer

- Over a period of several visits, a Java enterprise application was developed using JSF and PrimeFaces in conjunction with MySQL and SQLite databases. Eclipse was used for the development.
- The input data are passed to an application running in FORTRAN to perform detailed scientific calculations.
- The application is online at <https://phoenix.ens-lyon.fr/simulator/>.

Pima Community College and Public/Charter Schools, Tucson:

May 2003 – Nov. 2013

Instructor

- Part-time instruction, mostly in physics and astronomy.
- Organized star parties with telescopes and charts.

B6 Sigma, Inc., Santa Fe, New Mexico:

Aug. 2013 – Nov. 2013

Consulting Software Engineer

- Reverse engineered a large application in Java using NetBeans in order to locate the statistical packages it contained and how data were passed through the application, as suitable documentation was missing. A report was written using Word with flow diagrams.

Raytheon Missile Systems, Tucson, AZ:

Aug. 2010 – Jan. 2011

Web Developer and Software Engineer

- Worked at Raytheon employed by Apex Systems Inc. as a subcontractor to develop code for JSF applications on a JBoss server using Eclipse and Oracle to handle the inventory of missile components and munitions as part of the LOKI project.
- Reverse engineered previous C# code in the .NET framework, as well as C, and rewrote parts of these codes in Java.

Los Alamos Visual Analytics, Los Alamos, NM:

Jul. 2009

Software Consultant

- Some preliminary investigations of the use of Google Gadgets and related software were undertaken for web interfaces used for business and social networks.

Quantum Equities Inc., Las Vegas, NV and

1998 – 2007

TenthRock Consulting, San Diego, CA:*Scientific Software Consultant*

- Algorithms obtained from Russian sources were reverse engineered, then used as a basis to investigate voice stress analysis and related properties. All the mathematical processing of digitized speech was written in C, with Visual C++ being used for the graphical user interfaces and the displays. See the patent at the link <https://patents.google.com/patent/US6006188A/en>.

University of Arizona, Steward Observatory, Tucson:
Research Scientist

2003 – 2006

- Thermodynamic and spectroscopic calculations of gases at high temperatures relevant to the atmospheres of extra-solar giant planets and brown dwarfs.
- All the calculations were performed using FORTRAN 77 on Linux systems.
- Author and co-author of a number of peer reviewed scientific papers, see for example <http://iopscience.iop.org/article/10.1086/508708>.

Sandia National Laboratory, Albuquerque, NM:
Scientific Consultant

2000 – 2001

- The thermodynamic and spectroscopic properties of air heated to high temperatures by nuclear weapons were investigated under contract PO #10345 “Opacity Calculations of Air”.
- All the calculations were performed using FORTRAN 77 on a Red Hat Linux system. The US Air Force provided some of the FORTRAN code.

Employment, Consulting and Visiting Contracts ending before 2000

Worked at and/or visited various universities, research establishments and laboratories in the UK, USA, Germany and France on mathematical and scientific software development in astrophysics, defense and telecommunications as follows, with nearly all programming being done in FORTRAN:

- Performed thermodynamic calculations during several visits to the Division of Geological and Planetary Science at the California Institute of Technology, Pasadena.
- Kansas City, Missouri to evaluate the eligibility of a candidate from Wichita State University for NSF funding to perform detailed chemical equilibrium calculations.
- Contract 94-2044 “Windows on Science” funded by the US Air Force to give presentations to the Los Alamos, Lawrence Livermore and Sandia National Laboratories.
- AWE Aldermaston in the UK, and CEA-DAM and Saclay in France.
- Subcontractor funded by DNA (now DTRA) to perform thermodynamic and spectroscopic calculations for the Nevada Test Site through Maxwell Labs of San Diego, California.
- Reverse engineered FORTRAN code used by Eutelsat and converted to C in Paris, France.
- Postdoctoral contract in Los Alamos to perform scientific calculations.
- Wissenschaftliche Mitarbeiter at the Max-Planck-Institut für Astrophysik, Garching, Germany.

Education:

- **Ph.D.:** Astrophysics, University of St. Andrews, Scotland. Thesis: “An Investigation of Molecular Opacities for Late-Type Stars”. All computer codes were developed in Fortran IV, 66 and 77.
- **M.Sc.:** Astronomy, University of Sussex, England. Dissertation in partial fulfilment of degree: “Rotating Stars”. All computer codes were developed in Algol.
- **B.Sc.:** Physical Sciences, University of Surrey, England.
- **102 Professional Development Hours:** Completed a modeling workshop in mechanics at Pima Community College, June/July 2016.

Professional and Amateur Memberships/Associations:

Member of the International Astronomical Union
Fellow of the Royal Astronomical Society
Member of the British Astronomical Association
Member of the American Modeling Teachers Association

Foreign Languages: French, German, Spanish, and Italian

Professional Social Network: <http://www.linkedin.com/in/christophermartinsharp>

(Updated/corrected on 10/04/2018, 16/05/2018, 19/06/2018, 21/08/2018, 30/08/2018)