Christopher M. Sharp

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Summary:

I have many years of experience in developing algorithms used for science, mathematics and engineering in Java, C/C++, FORTRAN, Algol and Pascal. This includes reverse engineering undocumented code, rewriting it in another language, and linking code in one language to another, such as between Java, C/C++ and FORTRAN. The latter is particularly useful when required to maintain legacy code in FORTRAN.

More recent experience includes writing interfaces in HTML5, CSS3 and JavaScript (together with associated libraries) for user interfaces, including server-side development with JavaServer Faces with PrimeFaces. I am particularly interested in the graphical representation of data by making use of SVG, the HTML5 canvas tag, WebGL, ThreeJS, JOGL, and rendering Java Swing in a browser using Webswing and OmniFaces. I have also started considering the use of Python in conjunction with Java and other languages. I am familiar with several IDEs, in particular Eclipse.

I regard documenting code as particularly important, and I have published peer reviewed scientific papers and written technical laboratory reports in English and French.

Some specific interests include, by are not limited to, the following:

- **Server-side programming:** 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:** 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 shown with https://cs-cubed.com/physics/diatomic.html and https://cs-cubed.com/jsfsvg/clocks-calen.html.

- **Reverse engineering:** When required to reuse or rewrite undocumented or poorly documented code, and in some cases in another programming 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, see for example https://cs-cubed.com/geolocation/.

Employment, Consulting and Other Work:

Initiative work, Tucson, Arizona: Current
Working on projects that may bear fruit on a freelance basis in the future.
- Some test stl CAD files are rendered here at https://cs-cubed.com/stl/ as interactive 3D images using Three.js and WebGL, with a view of eventually marketing an invention.
- Code has been developed to perform astronomical and geometric calculations to determine the relative output power generated by solar panels for any orientation at any location using JSF 2.2 with OmniFaces 2.7. This application has not yet been deployed, but some preliminary documentation is linked with item 11 of the menu at https://cs-cubed.com/main.html**.**

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 and invited professor.
- Over a period of several visits, a JSF application was developed making use of 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 – Dec. 2018
Instructor
- Part-time instruction, mostly in physics and astronomy.
- At various times organize 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: 2003 – 2006
Research Scientist
- 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: 2000 – 2001
Scientific Consultant
- 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

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