Walton C. Gibson

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Education:

M.S., Electrical Engineering, The University of Illinois Urbana-Champaign, 1998
Areas of Study: Electromagnetic Theory, Computational Electromagnetics (CEM)

B.S., Electrical Engineering, Auburn University, 1996

Relevant Skills:

Radars: Radar systems, antennas, waveforms, signal processing, pulse compression, Doppler analysis, operating environments, synthetic aperture radar (SAR). Uniquely skilled in development and analysis of radar simulations, and analysis and interpretation of raw radar signature data.

Electromagnetic Signatures: Industry expert in the design, programming and use of computational electromagnetics (CEM) codes for electromagnetic signature prediction (Xpatch, FISC, SAF, CARLOS 3D, CICERO, *lucernhammer*), and the signature production process. Deep subject matter expertise in the Method of Moments (MOM) as applied to electromagnetic problems, and the analysis, interpretation and exploitation of measured and predicted signatures.

Software: Superior skills in the C/C++ programming languages. Key Strengths: Parallel processing, optimizations, numerical codes, computational geometry, computer graphics, ray tracing. Experienced in the acceleration of legacy and newer software codes using GPUs (via NVIDIA CUDA).

Experience:

Georgia Tech Research Institute   1/2016 - Present
Position: Senior Research Engineer
Responsibilities: Support the BMD Benchmark radar simulation development team as subject matter expert (SME) in radar environments, antennas, signal processing, and threat signatures. Develop new features, identify and repair bugs, and assist other Benchmark developers and users as needed.
Task Highlights: For the BMD Benchmark BMDS simulation, overhauled all legacy antenna code and implemented an object-oriented (OO) antenna framework supporting exotic antenna types as well as digital beam former (DBF) processing. Updated high-fidelity target radar cross section support code to natively support all MDA RF data products (scattering center models and radar cross section lookup tables). Implemented BMDS sensor discrimination algorithms within BMD Benchmark, and anchored Benchmark outputs against HWIL data and made improvements and fixes as appropriate.

deciBel Research, Inc.   3/2004 – 12/2015
Position: Staff Scientist and Technical Fellow
Responsibilities: Author of many in-house software libraries and programs for radar simulation and analysis. This includes libraries supporting target radar cross section, radar operating environments (atmospheric refraction and absorption, rain attenuation), radar signal processing, antennas, and radar detection and measurement algorithms. Representative for the company on all matters related to electromagnetic signatures, radar cross section, and predictive codes and methodology.
Task Highlights: For the MDA Project Hercules Green Team, wrote high-performance software for the parametric analysis of wideband radar signatures versus engagement geometry, and a massively parallel code to generate wideband radar signatures of very large chaff and debris clouds. For MSIC, wrote a software tool to extract, process and analyze data from Gray Star binary data files, and analyzed two data collects of interest. Helped draft the system requirements specification (SRS) for the JLENS Fire Control Radar (FCR) real-time digital stimulator (JSTM), and contributed to the FCR stimulator software code. Supported the development of RCS data products for MDA/DET under the MiDAESS contract, and wrote software to automate a large portion of the signature production process. Worked closely with the government customer in reviewing and refining the requirements for RCS products required in ground test and digital events.

XonTech, Inc.   3/2000 – 3/2004
Position: Engineer
Responsibilities: Represented the Huntsville office on matters related to electromagnetic signatures, and radar cross section, and predictive codes and methodology. Maintained in-house tools used in development of RCS data products.
Task Highlights: Led the RF signature production effort for the MDA Project Hercules Red Team. Developed curved surface CAD, facet and edge models, and all relevant signature code inputs, and performed all signature runs, post-processing, and validation.

Dynetics, Inc.   9/1998 – 9/1999
Position: Engineer
Responsibilities: Developed and worked with Xpatch facet models. Wrote software to modify and display these models. Provided guidance in the use of radar signature prediction codes and the development of frequency and time-domain signature products in the RF data production group.
Task Highlights: Developed software for predicting the RCS of sea-skimming missiles for the Office of Naval Intelligence (ONI).

Publications:

Books:

The Method of Moments in Electromagnetics, Chapman and Hall/CRC, 1998.
The Method of Moments in Electromagnetics, ***Second Edition***, Chapman and Hall/CRC, 2014.
The Method of Moments in Electromagnetics, ***Third Edition***, Chapman and Hall/CRC, 2021.

Journal Papers:

W. C. Gibson, "Efficient solution of electromagnetic scattering problems using multilevel adaptive cross approximation (MLACA) and LU factorization," *IEEE Trans. Antennas Propagat.*, vol. 68, pp. 3815–3823, May 2020.