James P. LaRue, PhD

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A Signal Processor with over twenty years of problem solving experience specializing in segmentation, anomaly detection, and algorithm optimization who understands the importance of the team setting to achieve success.

 **Time overview and four key areas of experience**

* 1980-1990: Associates degree in Instrumentation Technology, lead Electro-Mechanical Engineering Assistant and designer of Quality Assurance program for new product releases and repair department.
* 1990-2000: BA Mathematics and Education, MS Mathematics, taught high school and college mathematics.
* 2000-Now: PhD in Engineering and Applied Physics, Signal Processing and Data Analytics for Department of Defense and Commercial companies.

 **Test and Evaluation**

* Operated Vector Network Analyzers for Navy ship waveguide and antenna analysis and repair to mitigate excessive SWR performance *(Avondale Shipyards, New Orleans Louisiana).*
* Team developed End2End wireless Signals Intelligence system for implementing real time proof of concept analysis *(Air Force Information Directorate Test Lab, Rome, NY).*
* Medical Sterilizer electrical and mechanical test forcing redesign of factory pressure sensors, redesign of DC power supply grounding responsible for circuit board logic mishaps. Responsible for QA and calibration standards traced to 3rd degree Bureau of Standards *(Castle/Sybron, Rochester Instrument Systems, Taylor/Combustion Engineering, Rochester, NY and Communications Test Design, Atlanta, GA).*

 **Research and Development**

* Blind deconvolution and Independent Component Analysis for signals distorted by multipath and co-channel interference *(Naval Research Lab, Air Force Information Directorate, National Academies, ARL Penn State).*
* Characterized spectral effects of binary digit randomizers using Linear Recursive and Legendre Sequences, and Chinese Remainder Theorem *(Air Force Information Directorate, RDECOM, SUNYIT in Utica, NY).*
* Neural Networks and Bidirectional Associative Memory for Computer Vision *(Air Force Office of Scientific Research, DARPA).*

**R&D Results:**

* Completed novel algorithm designed to separate signal space from redundancy space by moving from existing eigenvalues methods into vector nullspace analysis using the ANOVA Kaiser-Varimax norm, Fourier transform, and secondary orthogonal transformations on the nullspace vectors. *Resulted in two research papers co-written written with SUNYIT and Cornell University professors.*
* Developed segmentation switch for signals of interest in low SNR using features of spectral entropy and cepstrum. *Integrated into RDECOM SOMBRERO SigInt system.*
* Designed matrix based method to blindly identify Error Detection and Correction polynomial coding. *Resulting in research paper on Finite Field theory with SUNYIT professor.*
* Successfully designed (first stabilized) bidirectional associative memory system to replace any multilayer neural network (for computer vision or other artificial neural network) which has shown to produce am order of magnitude decrease in image pattern recognition execution time, but more importantly, allows for cross-communication among neural network platforms. *Funded in part by Air Force Office of Scientific Research and DARPA. Patent-pending Joint Proximity Association Template (JPAT) device, by James LaRue and Denise LaRue dba Jadco Signals.*
* Cepstral based technique to extrapolate base waveform (either analog or binary) from Time series in order to tract its periodicity as a modulated orbital in Image domain. Copy write 2016, Audio-Visual Intelligence Protocol Evaluator (AVIPE). Demonstrated at Applied Imagery Pattern Recognition Workshop, October 2016, The Cosmos Club, Washington, DC. Demonstrated as high level complement to Hamilton-Tomkins electrocardiogram (ECG) characterization algorithm.

 **Data Analytics**

* Segmentation in mixture of structured and unstructured data sets after ETL.
* REST software analyses.
* Co-designed three stage 6-12 week on-site project plan: (1) Exploratory Data Analytics, (2) proof of concept predictive analytics model for acceptance by customer’s Data Architects, SQL and MongoDB ETL, Business Intelligence, and BD team members, (3) QA test and evaluation of final global solution.
* Recorded Big Data webinar for Charter Global IT, Atlanta, GA.

 **Data Analytic Commercial Projects:**

* Retained by home security firm to construct blind predictive home occupancy scheduling system for energy savings program using wireless motion and door sensors within home. Directed data base organization for optimizing ETL from MongoDB database. *(Vivint in Lehigh, Utah).*
* Retained by healthcare firm to build predictive statistics algorithm for employee absenteeism rates, based on ICD-9 codes. Implemented design of SQL extraction and delivered a hill-climber approach solution. *(Reed Group in Denver, Colorado).*
* Quality Assurance on vehicle notification platform service with respect to timing protocols within REST software architecture in order to characterize internal stages of time delays*. (Charter Global, Verizon Telematics in Atlanta, GA)*
* Retained as second party consultant to chip (wafer) manufacturing plant to impose quality assurance protocols in order to isolate defects in proof-of-concept statistical algorithm meant to predict manufacturing process errors with available suite of lamp, temperature, and pressure sensors. Exposed mis-calculations due to improperly integrated assumptions regarding device behavior. *(McKinsey Digital Labs, NY, and Global Foundries in Albany, NY).*

 **Modeling and Simulation**

* Modelled network communication system between ocean based grid of buoys and other sea, air, space and land-based systems. Utilized Navy Variable Terrain Radio Parabolic Equation (VTRPE) model and in conjunction with Qualnet’s network communications simulator/emulator. *(Space and Naval Warfare Center SPAWAR in Charleston, SC).*
* Modelled shallow water environment using Range dependent Acoustic Model (RAM) to characterize multipath effects of submarine sound propagation. *(University of New Orleans and Naval Research Center in Stennis, MS).*
* Modelled RF propagation effects for Fly-Away-Broadcast System (FABS) using open-source RF Signal Propagation and Terrain Analysis Tool (SPLAT !). *(Space and Naval Warfare Center SPAWAR).*

**Employment History**

2016 - Present Preventice Services, Houston, TX, Algorithm Engineer for electrocardiogram classification

2011 - 2016 Jadco Signals, contracted Scientist to Office of Scientific Research and DARPA

2008 – 2011 Scientific Research Corporation, Charleston, SC, Senior Scientist

2003 – 2008 National Academies, CACI, SUNYIT in Rome, NY, Post-Doc, Engineering Scientist, Instructor

2000 – 2003 Graduate Assistant with University of New Orleans and Naval Research Lab at Stennis

1995 – 2000 Mathematics Instructor for Jesuit High School, Louise S. McGehee school, and Nunez College

1980 – 1990 Electro-Mechanical Technician for Rochester Instrument Systems, Avondale Shipyards,

 W.S. Fleming and Associates for Energy Research, Castle Sybron Medical Systems

**Education**

1977-1982 AAS Monroe Community College, two years Engineering and Math at SUNY Buffalo

1990-1995 BA Mathematics, BA Math Ed from SUNY Potsdam NY, graduated Summa Cum Laude

 MS Mathematics Tulane University with concentrate in Abstract Algebra

2000-2003 PhD Engineering and Applied Science, University of New Orleans, received Bill J Good Physics

 Award, Graduate Assistant with UNO and NRL.

Programming skills: Matlab, Python, R

Research publications and references given upon demand.

TS Interim 2016