Oswaldo Aguirre Ortega
Computational Science Program
The University of Texas at El Paso (UTEP)
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EDUCATION

PhD in Computational Science   (Expected May 2014)
UTEP: The University of Texas at El Paso
Dissertation Title: New Multi-objective Evolutionary Game Theory
            Algorithm for Border Security"
Advisor: Dr. Heidi Taboada

M.S in Computational Science   May 2012
UTEP: The University of Texas at El Paso

MS in Industrial Engineering   December 2009
UTEP: The University of Texas at El Paso

BS in Electric and Mechanical Engineering   June 2005
Instituto Tecnologico de Chihuahua, Chihuahua Mexico

RESEARCH INTERESTS:

- Applied Operation Research
- Multiple Objective Optimization
- Evolutionary computation /Metaheuristics
- Network Optimization
- Security Applications
- High Performance Computing

MAJOR RESEARCH PROJECTS

- Development of a model for Intelligent patrolling using evolutionary computing and game theory techniques
- Design of an algorithm for the network reliability problem considering different conflicting objectives
- Design of metaheuristic algorithms, including evolutionary computation
- Evolutionary multiple objective algorithms
- Application of hierarchical clustering algorithms in post-Pareto optimality analysis

PEER REVIEWED PUBLICATIONS:

Aguirre, O. and Taboada, H., "A New Multiple Objective Evolutionary Algorithm to Optimize Patrolling Strategies". Elsevier Editorial System for Computers & Industrial Engineering (under review).

CONFERENCE PROCEEDING PUBLICATIONS:

1. **Aguirre, O.** and Taboada, H., "Intelligent Patrolling with Evolutionary-Game theory techniques considering Randomized Strategies." In Proceedings of the Industrial Engineering Research Conference, Puerto Rico, June 2013.

2. **Aguirre, O.** and Taboada, H., "An Evolutionary Game Theory Approach for Intelligent Patrolling". Complex Adaptive Systems Conference, Chicago, Washington D.C., November 2012.

3. **Aguirre, O.** and Taboada, H., "A Multiple-Objective Evolutionary Approach for Border Patrolling." In Proceedings of the Industrial Engineering Research Conference, Orlando, FL, June 2012.

4. **Aguirre, O.** and Taboada, H., "Dynamic Self Organizing Trees for Post Pareto Optimality Analysis". Complex Adaptive Systems Conference, Chicago, Ill, October 2011.

5. **Aguirre, O.** and Taboada, H., "A Multi-Objective Evolutionary Algorithm for Intelligent Patrolling". Proceedings of the 41st International Conference on Computers & Industrial Engineering, Los Angeles, CA, October 2011**.**

6. **Aguirre, O.,** Taboada, H., and Gutierrez, K., "Evolutionary Approach for Data Survivability and Security Optimization". IERC 61st Annual Conference and Expo 2011, Reno, NV, May 2011

7. **Aguirre, O.**, Villanueva, D. and Taboada, H., "Multi-Objective Network Reliability Optimization using Evolutionary Algorithms". In Proceedings of the 15th ISSAT International Conference on Reliability and Quality in Design, San Francisco, CA, August 2009

8. **Aguirre, O**. and Taboada, H., "A New Multiple Objective Evolutionary Algorithm for All-Terminal Network Reliability Evaluation". In Proceedings of the Industrial Engineering Research Conference, Miami, FL, June 2009.

PRESENTATIONS:

- **Aguirre, O.** and Taboada, H., "An Evolutionary Game Theory Approach for Intelligent Patrolling". Complex Adaptive Systems Conference, Chicago, Washington D.C., November 2011.

- **Aguirre, O.** and Taboada, H., "A Multiple-Objective Evolutionary Approach for Border Patrolling." In Proceedings of the Industrial Engineering Research Conference, Orlando, FL, June 2012.

- **Aguirre, O.** and Taboada, H., "Dynamic Self Organizing Trees for Post Pareto Optimality Analysis". Complex Adaptive Systems Conference, Chicago, Ill, October 2011.

- **Aguirre, O.** and Taboada, H., "A Multi-Objective Evolutionary Algorithm for Intelligent Patrolling". Proceedings of the 41st International Conference on Computers & Industrial Engineering, Los Angeles, CA, October 2011**.**

- **Aguirre, O.,** Taboada, H., and Gutierrez, K., "Evolutionary Approach for Data Survivability and Security Optimization". IERC 61st Annual Conference and Expo 2011, Reno, NV, May 2011

- Taboada, H., **Aguirre, O.**, and Gutierrez, K., "A Multiple Objective Evolutionary Algorithm to Maximize Data Security". Institute for Operations Research and Management Science (INFORMS) Computing Society Conference, Monterey, CA, January 2011.

- Taboada, H. and **Aguirre, O.**, "Post-Pareto Optimality for Multiple Objective Problems Using Self Organizing Trees". INFORMS Annual Conference, Austin, TX, November 2010.

- **Aguirre, O.** Taboada, H. and Valles, C., "Optimizing Information Survivability, Security, and Cost Using a New Evolutionary Algorithm". INFORMS Annual Conference, San Diego, CA, October 2009.

- **Aguirre, O.**, Villanueva, D. and Taboada, H., "Multi-Objective Network Reliability Optimization using Evolutionary Algorithms". In Proceedings of the 15th ISSAT International Conference on Reliability and Quality in Design, San Francisco, CA, August 2009

- **Aguirre, O**. and Taboada, H., "A New Multiple Objective Evolutionary Algorithm for All-Terminal Network Reliability Evaluation". In Proceedings of the Industrial Engineering Research Conference, Miami, FL, June 2009.

- **Aguirre, O** and Taboada, H., "Multiple Objective Evolutionary Algorithm to Minimize Information Vulnerability, Theft, and Cost". *INFORMS* Western Regional Conference, Tempe, AZ, April 2009.

- **Aguirre, O.**, Saavedra, J., and Moreno, O., "An Evolutionary Approach for Data Survivability and Security Optimization". UTEP Society for Advancement of Chicanos and Native Americans

in Science Research Expo, UTEP, El Paso, TX, April 2009. This poster won <u>second prize</u> in the Engineering category.

WORK EXPERIENCE

- **Teaching**
- Fall 2013

Teaching at graduate level at the department of Industrial Manufacturing and Systems Engineering at UTEP. Course taught: Reliability and Maintainability

- Fall 2012

Teaching at graduate level at the department of Industrial Manufacturing and Systems Engineering at UTEP. Course taught: Reliability and Maintainability

- **Research Projects**
  - Development of a Software for a decision support for patrolling Remote areas. Funded through Department of Homeland Security (DHS)/National Center for Border Security and Immigration (7/13-12/14)
  - Development of a model for scheduling Border Security operations in uncertain adversarial domains using evolutionary and game theory algorithms Funded through Department of Homeland Security (DHS)/National Center for Border Security and Immigration (7/10-12/11)
  - Development of an evolutionary algorithm and graphic user interface to solve the LORA (Level of Repair Analysis) problem founded by Hamilton Sundstrand (Summer 2009)

- **Research assistance**
  - Research in multiple objective optimization using metaheuristic evolutionary algorithms to solve network reliability
  - Research in evolutionary computing applied in security applications

- **Industry Internship**
  - SUPERIOR Wheel Manufactory Facility, Industrial Engineering Dept., Chihuahua, Chihuahua Worked on Continuous improvements activities and layout optimization. January-December 2005
  - Winston Mexico Technology Manufactory Facility, Information Technology Dept., Juarez, Chihuahua. Worked on computer network support and design. November 2009 - February 2010

COMPUTER SKILLS:

- Microsoft Office: Word, Excel, Power Point, Access
- Statistics: Minitab
- Simulation: Arena
- Mathematics: MATLAB, Wolfram MATHEMATICA
- Optimization   LINDO
- Design: AutoCAD, Solid Works
- Programming: MATLAB, C/C++

COMPUTER SKILLS:

- Spanish: Native language
- English: Fluent Speaker

COURSES TAKEN

- Introduction to Computational Science
- Mathematical an Computer Modeling
- Digital Signal Processing
- Advance Algorithms
- Numerical Optimization
- Parallel and Computer Programming
- Linear an Combinatorial Optimization Methods
- Reliability and Maintainability
- Modeling / Analysis – Manufacturing Process
- Design of Experiments
- Special Topic: Computational Strategic Reasoning
- Special Topic: Interior Point Methods for Linear Programming

AFFILIATIONS - PROFESSIONAL ORGANIZATIONS (STUDENT MEMBERSHIP):

- Institute of Industrial Engineers (IIE)
- Institute for Operations Research and Management Sciences (INFORMS)

REFERENCES:

Heidi Taboada, PhD Research Advisor, Assistant Professor, UTEP, Email: hataboada@utep.edu

Jose Espiritu, PhD Committee Member, Assistant Professor, UTEP, Email: jfespiritu@utep.edu

Leticia Velazquez, PhD Committee Member, Associate Professor, UTEP, Email: leti@utep.edu