**Education:** Master of Science in Mechanical Engineering, 12/99 University of New Mexico, Albuquerque, NM

> **Bachelor of Science in Mechanical Engineering**, 12/97 Turabo University, Gurabo, PR

- Experience: Sandia National Laboratories, Albuquerque, NM Summer of 1997 and 01-98 to Present
  Senior Member of the Technical Staff Thermal analysis and testing for the Transportation Risk and Packaging Department.
  - Perform thermal evaluation of containers that are used for the transportation and storage of hazardous materials using finite element analysis (FEA) and computational fluid dynamics (CFD) fire codes. Manage the development of the Cask Analysis Fire Environment (CAFE) code a three-dimensional CFD code used for the analysis of cask response to fire environments. Perform thermal characterization of damaged materials. Chair of the ASTM E05.13, Task Group 9 task group that wrote a standard for the thermal qualification of transportation packages (E2230-02). Conducted thermal analyses of spent nuclear fuel shipping and storage casks as part of the NRC Package Performance Study.
  - Summer Intern Transportation Department.
    - Completed a conceptual design of an insulated package for a data logger undergoing a fire test and capable of surviving a 30-foot drop test without logger damage.

# Turabo University, School of Engineering, Gurabo, PR

08-95 to 12-97

- Research Assistant
  - Investigated the total, direct, and diffuse solar radiation in Puerto Rico. Performed data logger installation and programming as well as data collection and analysis.
  - Investigated the response of "smart" materials (SMA) when exposed to thermal and electrical loads.

# **Publications (partial list):**

# <u>Journals:</u>

Kramer, M.A., M. Greiner, J.A. Koski, C. Lopez, and A. Suo-Anttila, "Measurements of Heat Transfer to a Massive Cylindrical Object Engulfed in a Regulatory Pool Fire," Journal of Heat Transfer, Vol. 125, pp. 100-117, February 2003.

# SAND Reports:

Mills, G.S., D.J. Ammerman, and C. Lopez, "Accident Conditions versus Regulatory Tests for NRC-Approved UF<sub>6</sub> Packages", Sandia National Laboratories, SAND2003-0302, February 2003.

# **Conference Papers:**

Lopez, C., J.A. Koski, and A. Suo-Anttila, "Development and Use of the CAFE-3D Code for Analysis of Radioactive Material Packages in Fire Environments", Proc. of the INMM 44<sup>th</sup> Annual Meeting, Phoenix, Arizona, July 2003.

Lopez, C., "Fire Analysis of a Spent Nuclear Fuel Dry Storage Cask Using the CAFE-3D Fire Code", Proc. of the INMM 44<sup>th</sup> Annual Meeting, Phoenix, Arizona, July 2003.

Lopez, C., "Thermal Analyses Performed for the NRC Package Performance Study (PPS) Test Protocols", Proc. of the INMM 44<sup>th</sup> Annual Meeting, Phoenix, Arizona, July 2003.

Lopez, C., J. Koski, J. Nakos, W. Gill, C. Bajwa, M. Feldman, J. Hovingh, and A. Patko, "Development of a Standard Practice for the Thermal Qualification of Type B Radioactive Material Packages", Proc. of the INMM 44<sup>th</sup> Annual Meeting, Phoenix, Arizona, July 2003.

Ammerman, D.J., C. Lopez, J. A. Koski, and A. Kapoor, "Comparison of Selected Highway and Railway Accidents to the 10CFR71 Hypothetical Accident Sequence and NRC Risk Assessments", Proc. of the INMM 44<sup>th</sup> Annual Meeting, Phoenix, Arizona, July 2003.

Snyder A.M., A.J. Murphy, J.L. Sprung, D.J. Ammerman, and C. Lopez, "Spent Fuel Transportation Package Performance Study – Experimental Design Challenges", Proc. of the 2003 Waste Management Symposium (WM'03), Tucson, Arizona, February 2003.

Kramer, M.A., M. Greiner, J.A. Koski, and C. Lopez, "Uncertainty of Heat Transfer Measurements in an Engulfing Pool Fire," presented at the Symposium on Thermal Measurements: The Foundation of Fire Standards, ASTM Committee E05 on Fire Standards, Dallas, Texas, December 2001.

Lopez, C. and J.A. Koski, "Analysis of the effect of pipeline fires on legal weight truck transportation casks," Proc. of the 13th International Symposium on the Packaging and Transportation of Radioactive Material (PATRAM), (Published on CD-ROM, no page numbers), Chicago, Illinois, September 2001.

Lopez, C., and J.D. Pierce, "Characterization of thermophysical properties of layered perforated aluminum and aramid cloth," Proc. of the 13th International Symposium on the Packaging and Transportation of Radioactive Material (PATRAM), (Published on CD-ROM, no page numbers), Chicago, Illinois, September 2001.

Koski, J.A., G.S. Mills, and C. Lopez, "Probability of pipeline or railroad fires affecting spent nuclear fuel transportation casks," Proc. of the 13th International Symposium on the Packaging and Transportation of Radioactive Material (PATRAM), (Published on CD-ROM, no page numbers), Chicago, Illinois, September 2001.

Kramer, M.A., M. Greiner, J.A. Koski, C. Lopez, and A Suo-Anttila, "Measurements of Heat Transfer to a Massive Cylindrical Object Engulfed in a Regulatory Pool Fire," Proceedings of the 2001 National Heat Transfer Conference, Paper number NHTC01-11466, (Published on CD-ROM, no page numbers), Anaheim, California, June 2001.

Lopez, C., J.A. Koski, and A. Razani, "Estimates of Error Introduced when One-Dimensional Heat Transfer Techniques are Applied to Multidimensional Problems", Paper NHTC2000-12037, in *Proc. 2000 National Heat Transfer Conference*, ASME, Pittsburgh, PA, August 2000.

Koski, J.A., C. Lopez, A. Suo-Anttila, "Numerical Prediction of Heat-Flux to Massive Calorimeters Engulfed in Regulatory Fires with the Cask Analysis Fire Environment (CAFE) Model", in *Proc. 2000 Pressure Vessels and Piping Conference*, ASME, Seattle, WA, July 2000.

Kramer, M. A., M. Greiner, J.A. Koski, C. Lopez, and A. Suo-Anttila, 2000, "Design of an Experiment to Measure Heat Transfer to a Massive Object Engulfed in a Full Scale Regulatory Fire," in *Proc. 2000 Pressure Vessels and Piping Conference*, ASME, PVP-Vol. 408, pp. 125-131, Seattle, WA, July 2000.

Koski, J.A., C. Lopez, A. Suo-Anttila, M.A. Kramer, and M. Greiner, "Numerical Prediction of Heat Flux to Massive Calorimeters Engulfed in Regulatory Fires using the Cask Analysis Fire Environment (CAFE) Model," in *Proc. 2000 Pressure Vessels and Piping Conference*, ASME, PVP-Vol. 408, pp. 117-123, Seattle, WA, July 2000.