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Curriculum Vitae —English—

Luis E. García Castillo

September 2015

PERSONAL, ACADEMIC AND PROFESSIONAL DATA

PERSONAL DATA

Last Name, Surname:	García-Castillo, Luis E.
Passport No.:	AE434750
Country:	Spain
Birth Date:	8-Nov-1967
Professional Situation:	Profesor Titular de Universidad (Associate Professor)
Work address:	
	Departamento de Teoría de la Señal y Comunicaciones Universidad Carlos III de Madrid, Escuela Politécnica Superior, Edifiio Torres Quevedo (Dpcho. 4.2.D05), Avda. de la Universidad, 30. 28911 Leganés (Madrid), Spain.
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EDUCATION

- *Ingeniero de Telecomunicación* (M.S. in Electrical Engineering), Universidad Politécnica de Madrid, 1992.

  Title of M.S. Thesis (translated): "Full Wave Analysis of Microwave Waveguiding Structures Using the Finite Element Method with Edge Elements". Advisor: Prof. M. Salazar-Palma.

- *Doctor Ingeniero de Telecomunicación* (Ph.D. in Electrical Engineering), Universidad Politécnica de Madrid, 1998.

  Title of Ph.D. Thesis (translated): "Efficient Techniques in the Application of the Finite Element Method to Electromagnetic Problems". Advisor: Prof. M. Salazar-Palma.

  The Ph.D. Thesis received two prizes from:

  - *Colegio Oficial de Ingenieros de Telecomunicación* (the spanish Institute of Electrical Engineering)
  - Universidad Politécnica de Madrid

APPOINTMENTS

- *Becario de Investigación* (Research Assistant)

  Date: September 1st, 1993 – August 31st, 1997
  Dedication: Full time
  University: Universidad Politécnica de Madrid
  College: E.T.S.I. de Telecomunicación
  Department: Señales, Sistemas y Radiocomunicaciones

- *Profesor Titular de Escuela Universitaria Interino* (temporary holder of an Associate Professor position)

  Date: October 1997 – April 2000
  Dedication: Full time
  University: Universidad Politécnica de Madrid
  College: E.U.I.T. de Telecomunicación
  Department: Ingeniería Audiovisual y Comunicaciones

- *Profesor Titular de Universidad* (Associate Professor)

  Date: April 2000 – September 2005
  Dedication: Full time
  University: Universidad de Alcalá
  College: Escuela Politécnica Superior
  Department: Teoría de la Señal y Comunicaciones

- *Profesor Titular de Universidad* (Associate Professor)

  Date: October 2005 – present
  Dedication: Full time
  University: Universidad Carlos III de Madrid
  College: Escuela Politécnica Superior
  Department: Teoría de la Señal y Comunicaciones

RESEARCH INTERESTS

Numerical methods (mainly finite elements —FE—) for computational electromagnetics including:

- Higher-order curl-conforming elements
- Open region problems (methods for mesh truncation)

- Hybrid methods (FE, integral approaches and asymptotic techniques)
- Adaptive FE (h and hp types)
- High Performance Computing

TEACHING EXPERIENCE

Undergraduate level:

- *Radiodifusión* (Broadcasting Radio Systems)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: Escuela Politécnica (Universidad de Alcalá)
- *Radiodeterminación* (Radiodetermination Systems)

  Degree: M.S. in Electrical Engineering
  College: Escuela Politécnica (Universidad de Alcalá)
- *Transmisión por Soporte Físico* (Microwave Engineering)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: Escuela Politécnica (Universidad de Alcalá)
- *Sistemas Radioeléctricos* (Introduction to Radio Systems)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: Escuela Politécnica (Universidad de Alcalá)
- *Sistemas de Comunicación* (Communication Systems)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: Escuela Politécnica (Universidad de Alcalá)
- *Redes y Servicios* (Telecommunication Networks and Services)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: Escuela Politécnica (Universidad de Alcalá)
- *Microondas* (Microwave Engineering)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: E.U.I.T. Telecomunicación (Universidad Politécnica de Madrid)
- *Laboratorio de Tecnologías de Radiocomunicación* (Radiocommunication Technology Laboratory)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: E.U.I.T. Telecomunicación (Universidad Politécnica de Madrid)
- *Microondas y Circuitos de Alta Frecuencia* (Microwave Engineering and High Frequency Circuits)

  Degree: B.S. in Electrical/Telecommunication Engineering
  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

- *Laboratorio de Radiofrecuencia* (Radio Frequency Laboratory)

  Degree: B.S. in Electrical/Telecommunication Engineering

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

- *Radiocomunicaciones* (Radio Communication Systems)

  Degree: M.S. in Electrical Engineering

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

- *Análisis y Diseño de Circuitos* (Analysis and Design of Electric Circuits)

  Degree: B.S. in Electrical/Telecommunication Engineering

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

- *Tecnologías de Alta Frecuencia* (Technologies for High Frequency Applications)

  Degree: B.S. in Electrical/Telecommunication Engineering

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

- *Campos Electromagnéticos* (Electromagnetic Fields)

  Degree: B.S. in Electrical/Telecommunication Engineering

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

Graduate level:

- *Técnicas Avanzadas en Tecnología Radar* (Advanced Radar Techniques)

  Degree: Ph.D. in Electrical Engineering

  College: Escuela Politécnica (Universidad de Alcalá)

- *Propagación, Radiación y Dispersión de Ondas Electromagnéticas* (Propagation, Radiation and Scattering of Electromagnetic Waves)

  Degree: Ph.D. in Electrical Engineering

  College: E.T.S.I. Telecomunicación (Universidad Politécnica de Madrid)

- *Técnicas Avanzadas de Microondas* (Advanced Techniques for Microwave Engineering)

  Degree: Ph.D. in Electrical Engineering

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

- *Tecnologías de Alta Frecuencia* (Technologies for High Frequency Applications)

  Degree: Ph.D. in Electrical Engineering

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

- Antennas and Radar Cross Section

  Degree: Master in Aircraft Systems Integration

  College: Escuela Politécnica Superior (Universidad Carlos III de Madrid) & EADS

- Computer Modeling of Electromagnetic Problems

Degree: Master in Industrial Mathematics

College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

– *Subsistemas de Radiofrecuencia y Antenas* (Radiofrequency Subistems and Antennas)

Degree: Master in Telecommunication Engineering

College: Escuela Politécnica Superior (Universidad Carlos III de Madrid)

Other courses and seminars:

– "Introduction to Numerical Methods in Electromagnetics" (2 h), Departamento de Señales, Sistemas y Radiocomunicaciones, E.T.S.I. Telecomunicación, Madrid (Spain), March 1995.

– "An Introduction to Computational Electromagnetics", 9th International Travelling Summer Course on Microwaves & Lightwaves, University of Roma 'Tor Vergata', Roma (Italy), 1999.

– "Application of the Finite Element Method to the Solution of Frequency Domain and Time Domain Electromagnetic Problems" (6.5 h), **2000 IEEE AP-S Short Courses**, Salt Lake City, Utah, USA, Jul., 2000.

– "An Introduction to Computational Electromagnetics", 11th International Travelling Summer Course on Microwaves & Lightwaves, Universidad Politécnica de Madrid, Madrid (Spain), 2001.

– "Communications" (80 h), III Course for Inclusion in Vigilance Customs Department, Communications Speciality. Escuela de la Hacienda Pública, Madrid (Spain), 2001.

– "Microwave and High Frequency Circuits" (32 h), INDRA, Madrid (España), 2005, 2006, 2007.

– "Fundamentals of Electromagnetism" (16 h), INDRA, Madrid (España), 2010, 2011.

– "Waveguides and Tranmission Lines" (16 h), INDRA, Madrid (España), 2011.

– "Introduction to Terrestrial Navigation Systems" (16 h), INDRA, Madrid (España), 2012.

PARTICIPATION IN RESEARCH & DEVELOPMENT PROJECTS FOUNDED BY PUBLIC AGENCIES AND INSTITUTIONS

AS PRINCIPAL INVESTIGATOR

1. *Desarrollo de Antenas Conformadas a Superficies* (Conformal Antennas).

   Financial entity: *Ministerio de Ciencia y Tecnología* (National Board for Research in Science and Technology) under Project TIC2001-1019.

   Duration: January 2002 – January 2005

   Number of researchers: 7

   Budget: 73678 EUR

2. *Simulador Electromagnetico Haciendo Uso de Procedimientos Autoadaptativos hp* (Electromagnetic Simulator Making Use of *hp* Autoadaptive Procedures).

   Financial entity: *Ministerio de Educación y Ciencia* (National Board for Research in Education and Science) under Project TEC2004-06252/TCM.

   Duration: December 2004 – December 2007

   Number of researchers: 8

   Budget: 59.660,00 EUR

3. *Paralelización de Simulador Electromagnético para el Análisis de Antenas y Sección Radar de Objetos* (Parallelization of Electromagnetic Solver for the Analysis of Antennas and Radar Cross Section of Objects).

   Financial entity: Regional Government of Madrid, Project CAM-UAH 2005/042 of IV PRICIT (Regional Planning of Scientific Research and Technology Innovation)

   Duration: January-2006 – December-2006

   Number of researchers: 9

   Budget: 17400 EUR

4. Self-Adaptive Electromagnetic Solver Using *hp*-Finite Elements for the Analysis of the Scattering and Radiation of Electromagnetic Waves.

   Financial entity: European Office of Aerospace Research & Development (EOARD), detachment of the Air Force Office of Scientific Research (AFOSR), directorate of the Air Force Research Laboratory (AFRL), USA.

Duration: April 2007 – March 2008

Number of researchers: 5

Budget: 25000 USD

5. *Adaptatividad Automática hp en Tres Dimensiones para el Análisis de Dispositivos Pasivos y Radiantes de Microondas* (Automatic *hp*-Adaptivity in Three Dimensions for the Analysis of Passive and Radiating Structures in Microwave Technology).

   Financial entity: *Ministerio de Educación y Ciencia* (National Board for Research in Education and Science) under Project TEC2007-65214/TCM.

   Duration: December 2007 – December 2010

   Number of researchers: 12

   Budget: 85.063,00 EUR

6. *Análisis de Estructuras Periódicas Finitas Regulares e Irregulares mediante Técnicas de Descomposición de Dominios en Paralelo con Adaptatividad hp Automática* (Analysis of Periodic-Based Regular and Irregular Finite Structures Using Parallel Domain Decomposition Methods and Self-Adaptive *hp*-Finite Elements).

   Financial entity: *Ministerio de Ciencia e Innovación* (National Board for Research in Science and Technology) under Project TEC2010-18175/TCM.

   Duration: December 2010 – December 2013

   Number of researchers: 10

   Budget: 168.432,00 EUR

AS RESEARCHER

1. *Antena Adaptativa en Tecnología Monolítica para Comunicaciones por Satélite* (Adaptive Array Antenna in Monolithic Technology for Mobile Satellite Communications).

   Financial entity: National Government of Spain,

   Project Id: TIC93-0055-C03-01

   Duration: March 1993 – March 1996

2. *Antenas Adaptativas para Señales de Espectro Ensanchado y Secuencia Directa* (Adaptive Antennas for Direct Sequence Spread Spectrum Signals).

   Financial entity: National Government of Spain,

   Proyect Id: TIC96-0724-C06-01

Duration: June 1996 – June 1999

3. *Desarrollo de Antenas Multifuncionales Compactas de Alta Eficiencia basadas en EBGs y Metamateriales* (Multifunctional and Compact Antennas of High Efficiency based on EBGs and Metamaterials).

   Financial entity: Regional Government of Madrid, Spain.

   Proyect Id: CCG06-UC3M/TIC-0803

   Duration: January-2007 – December-2007

   Number of researchers: 12

   Budget: 15000 EUR

4. *Desarrollo de Nuevas Antenas Impresas de Banda Ultra Ancha* (Development of New Planar Ultra-Wide Band Antennas).

   Financial entity: Regional Government of Madrid, Spain.

   Proyect Id: CCG07-UC3M/TIC-3393

   Duration: January-2008 – December-2008

   Number of researchers: 12

   Budget: 176000 EUR

5. *TERAENSE: Terahertz Technology for Electromagnetic Sensor Applications.*

   Financial entity: National Government of Spain (CONSOLIDER program)

   Proyect Id: CONSOLIDER CSD2008-0068.

   Duration: December 2008 – December 2013

   Number of researchers: 120

   Budget: 3.5M EUR

6. *Miniaturization of Antennas* (Miniaturización de Antenas).

   Financial entity: National Government of Spain. Partnership with AIRBUS MILITARY.

   Duration: January 2014 – December 2016

   Number of researchers: 5 (sub-project)

   Budget: 282512 EUR (sub-project)

7. *Development of an Integrated System with High Data Rate at THz Frequencies* (Desarrollo de un Sistema Integrado de Alta Tasa de Datos en Frecuencia de THz).

   Financial entity: National Government of Spain. Partnership with UPN, UC3M-GOTL

Proyect Id: TEC2013-47753-C3-2-R.

Duration: January 2014 – December 2016

Number of researchers: 15 (sub-project)

Budget: 238854 EUR (sub-project)

8. *Photonics and Radiofrequency Industrial Developments Applied to Experimental Techniques for Spatial Geodesia Applications (DIFRAGEOS)* (Desarrollos Industriales Fotónicos y de Radiofrecuencia y Aplicación a Técnicas Experimentales de Geodesia Espacial —DIFRAGEOS—).

   Financial entity: Regional Government of Madrid, Spain. Partnership with UC3M-GOTL, UPM, UAM, IN- TA, IGN

   Duration: October 2014 – September 2017

   Number of researchers: 50

   Budget: 600000 EUR

PARTICIPATION IN RESEARCH & DEVELOPMENT PROJECTS WITH INSTITUTIONS AND COMPANIES

AS PRINCIPAL INVESTIGATOR

1. *Simulation/Analysis of Electromagnetic Coverage on Tactic Vehicles of the Army of Inhibitors IED. Part I: BMR, IVECO LMV, IVECO M250* (Simulación/Análisis Cobertura Electromagnética Sobre Vehículos Tácticos del ET de Emisores de Inhibidores IED. Parte I: BMR, IVECO LMV, IVECO M250).

   Company: INDRA SISTEMAS, S.A.

   Duration: April 2009 – January 2010

2. *Analysis of the RCS of Optic Periscope J and Optotronic PERCOSUB 2000 of Submarine S70* (Análisis de la Sección Eficaz Radar (RCS) de los Periscopios Óptico J y Optrónico PERCOSUB 2000 del Submarino S70).

   Company: INDRA SISTEMAS, S.A.

   Duration: June 2009 – July 2009

3. *Electromagnetic Simulation of Antennas* (Simulación Electromagnética de Antenas).

   Company: INDRA SISTEMAS, S.A.

   Duration: January 2014 – December 2014

4. *Computer Simulation of a RFID 3DCOIL* (Análisis mediante Ordenador de un RFID 3DCOIL).

   Company: Fundación CIM (UPC)

   Duration: June 2014 – July 2014

5. *Numerical Simulation of Fluid Dynamics* (Simulación Numérica de Dinámica de Fluidos).

   Descripción: El objetivo del trabajo consiste en la simulación numérica de dinámica de fluidos de diversas estructuras haciendo uso del software STARCCM+ y la estructura científico-técnica *hardware* del Grupo de Investigación.

   Company: INDRA SISTEMAS, S.A.

   Duration: January 2014 – December 2015

6. *Computer Simulation of a hybris RFID 3DCOIL (low and high frequencies)* (Análisis mediante Ordenador de un RFID 3DCOIL hibrido (alta y baja frecuencia)).

   Descripción: El objetivo del trabajo consiste en la simulación electromagnética de un dispositivo RFID con objeto de caracterizar su sensibilidad relativa en diversas orientaciones respecto a la dirección de un campo magnético uniforme. El dispositivo RFID es híbrido pudiendo trabajar en alta y baja frecuencia.

   Company: Fundación CIM (UPC)

   Duration: March 2015 – April 2015

AS RESEARCHER

☆ With Foreign Institutions and Companies

1. *Application of Wavelets to Finite Element Techniques*

   Company: Nemours & Company

   Duration: During the first stay in Syracuse University (see section of Other Research Activities).

2. *Application of the Finite Element Method for Quasi-Static and Dynamic Analysis of 2D Arbitrarily Shaped Inhomogeneous Anisotropic Multiconductor and Multidielectric Waveguiding Structures utilizing the Classical Elements and Edge Elements*

   Institution: IEEE (through CAEME, University of Utah (USA))

   Duration: 1992–1994

3. *Matrix Pencil for Late Time Response Characterization of Radar Signals*

   Institution: Rome Lab.

   Duration: During the second stay in Syracuse University (see section of Other Research Activities).

4. *Application of the Hilbert Transform to Electromagnetic Phenomena*

   Institution: Rome Lab.

   Duration: During the third stay in Syracuse University (see section of Other Research Activities).

5. *Numerical Methods for Antenna Analysis and Design: A New Full Wave Electromagnetic Simulator*

Institution: OHRN Enterprises, Inc.

Duration: June 2011 – May 2012

6. *Numerical Methods for Antenna Analysis and Design: A New Full Wave Electromagnetic Simulator (Part 2)*

   Institution: OHRN Enterprises, Inc.

   Duration: June 2012 – May 2014

☆ With National Institutions and Companies

1. *Desarrollo de Diversos Subsistemas de un Interrogador para Radar Secundario Modo-S* (Development of Several Subsystems of a Secondary Radar Mode-S Transponder)

   Company: INISEL-CESELSA (at present INDRA-DTD)

   Duration: May 1993 – December 1993

2. *Desarrollo de Tecnologías Avanzadas de Multiplexores de Radiofrecuencia Espaciales* (Development of Advanced Technologies for Satellite Microwave Multiplexers)

   Company: ALCATEL ESPACIO, S.A.

   Duration: October 1995 – December 1996

3. *Diseño de un Sistema Adaptativo para Comunicaciones Tácticas* (Design of an Adaptive System for Tactics Communications)

   Company: AMPER Programas de Electrónica y Comunicaciones

   Duration: July 1996 – January 1998

4. *Desarrollo de Herramientas de CAD para la Síntesis de Filtros a Resonadores* (Development of CAD Tools for the Synthesis of Dielectric Resonator Filters)

   Company: ALCATEL ESPACIO S.A.

   Duration: 1997

5. *Desarrollo de Modelos de Banda Ancha para el Diseño de Filtros a Resonadores Dieléctricos* (Development of Wide Band Models for the Synthesis of Dielectric Resonator Filters)

   Company: ALCATEL ESPACIO S.A.

   Duration: June 1998 – June 1999

6. *Subsistema Transmisor-Receptor para un Radar de Baja Probabilidad de Intercepción* (Transmiter-Receiver Subsystem for a Low Probabilty of Interception Radar)

   Company: INDRA SISTEMAS S.A.

   Duration: 1999–2000

7. *Transceptor para Sistemas LMDS con Modulación QAM* (Transceiver for LMDS Systems with QAM Modulation)

   Company: IKUSI

   Duration: 1999–2000

8. *Colaboración en Investigación y Desarrollo de Antena MIMO-MISO para Nuevo Estándar DVB-T2* (Collaboration in Research and Development of Antenna MIMO-MISO for New Standard DVB-T2).

   Company: Sistemas Radiantes Francisco Moyano S.A.

   Duration: September 2010 – December 2010

9. *Desarrollo Industrial de una Antena Cuatribanda para Estación Base de Telefonía Móvil* (Industrial Development of A Fourband Antenna for Base Station of Mobile Telephony)

   Company: KAVVERI TELECOM ESPAÑA S.L.

   Duration: January 2011 – July 2010

10. *Desarrollo Industrial de una Antena Cuatribanda para Estación Base de Telefonía Móvil* (Industrial Development of A Fourband Antenna for Base Station of Mobile Telephony)

    Company: RYMSA

    Duration: January 2011 – July 2010

11. *Medida de Antenas de Distintas Empresas con Starlab Satimo cedido por Telefónica* (Measurement of Antennas of a Number of Companies with Starlab Satimo granted by Telefónica)

    Company: a number of telecommunication companies

    Duration: May 2016 – May 2016

SCIENTIFIC PUBLICATIONS

BOOKS

1. M. Salazar-Palma, T. K. Sarkar, L. E. García-Castillo, T. Roy, and A. R. Djordjevic, *Iterative and Self-Adaptive Finite-Elements in Electromagnetic Modeling*. Norwood, MA: Artech House Publishers, Inc., 1998.

2. T. K. Sarkar, M. Salazar-Palma, M. C. Wicks *et al.*, *Wavelet Applications in Engineering Electromagnetics*. Norwood, MA: Artech House Publishers, Inc., 2002.

CHAPTERS IN BOOKS

1. M. Salazar-Palma and L. E. García-Castillo, *Finite Element Software for Microwave Engineering*, ser. Wiley Series in Microwave and Optical Engineering. John Wiley & Sons, Inc., 1996, ch. "Self-Adaptive Procedures for Waveguiding Structures Analysis", pp. 401–432.

CONTRIBUTIONS OF CHAPTERS IN BOOKS

1. T. K. Sarkar, L. E. García-Castillo, M. Salazar-Palma, T. Roy, and R. S. Adve, "Solution of Maxwell's equations by using wavelet concepts," in *Electromagnetic Environments and Consequences*, J. Serafin, P. Dupouy, and J. C. Bolomey, Eds., 1995, pp. 1604–1612, chapter 17.2, Part. 2.

ARTICLES IN BOOKS

1. T. K. Sarkar, L. E. García-Castillo, M. Salazar-Palma, T. Roy, and R. S. Adve, "Utilization of wavelet concepts in finite elements for efficient solution of Maxwell's equations," in *Ultra-Wideband Short-Pulse Electromagnetics 2*, I. Carin and L. R. Paulsen, Eds., vol. 2, 1995, pp. 465–473.

ARTICLES IN INTERNATIONAL JOURNALS

1. T. K. Sarkar, R. S. Adve, L. E. García-Castillo, and M. Salazar-Palma, "Utilization of wavelet concepts in finite elements for efficient solution of differential form of Maxwell's equations," *Radio Science*, vol. 29, no. 4, pp. 965–977, Jul-Aug 1994, invited paper in special issue on "Fast Forward and Inverse Scattering Methods".

2. L. E. García-Castillo, T. K. Sarkar, and M. Salazar-Palma, "An efficient finite element method employing wavelet type basis functions," *The International Journal for Computation and Mathematics in Electric and Electronic Engineering —COMPEL—*, vol. 13, Sup. A, pp. 287–292, May 1994.

3. L. E. García-Castillo, M. Salazar-Palma, T. K. Sarkar, and R. S. Adve, "Efficient solution of the differential form of Maxwell's equations in rectangular regions," *IEEE Transactions on Microwave Theory and Techniques*, vol. 43, no. 3, pp. 647–654, Mar. 1995.

4. J. I. Alonso-Montes, J. M. Blas, L. E. García-Castillo, J. Ramos, J. de Pablos, J. Grajal, G. Gentili, J. Gismero, and F. Pérez-Martínez, "Low cost electronically steered antenna and receiver system for mobile satellite communications," *IEEE Transactions on Microwave Theory and Techniques*, vol. 44, no. 12, pp. 2438–2449, Dec. 1996.

5. G. G. Gentili, L. E. García-Castillo, M. Salazar-Palma, and F. Pérez-Martínez, "Green's function analysis of single and stacked rectangular microstrip patch antennas enclosed in a cavity," *IEEE Transactions on Antennas and Propagation*, vol. 45, no. 4, pp. 573–579, Apr. 1997.

6. T. K. Sarkar, C. Su, R. S. Adve, M. Salazar-Palma, L. E. García-Castillo, and R. R. Boix, "A tutorial on wavelets from an electrical engineering perspective. Part I: Discrete wavelet techniques," *IEEE Antennas and Propagation Magazine*, vol. 40, no. 5, pp. 49–70, Oct. 1998, Invited paper.

7. L. E. García-Castillo and M. Salazar-Palma, "Second-order Nédélec tetrahedral element for computational electromagnetics," *International Journal of Numerical Modelling: Electronic Networks, Devices and Fields (John Wiley & Sons, Inc.)*, vol. 13, no. 2-3, pp. 261–287, March-June 2000.

8. L. E. García-Castillo, A. J. Ruiz-Genovés, I. Gómez-Revuelto, M. Salazar-Palma, and T. K. Sarkar, "Third-order Nédélec curl-conforming finite element," *IEEE Transactions on Magnetics*, vol. 38, no. 5, pp. 2370–2372, Sep. 2002.

9. I. Gómez-Revuelto, L. E. García-Castillo, F. Sáez de Adana, M. Salazar-Palma, and T. K. Sarkar, "A novel hybrid FEM high frequency technique for the analysis of scattering and radiation problems," *Journal of Electromagnetic Waves and Applications*, vol. 18, no. 7, pp. 939–956, 2004.

10. J. Gopalakrishan, L. E. García-Castillo, and L. F. Demkowicz, "Nédélec spaces in affine coordinates," *Computer & Mathematics with Applications*, vol. 49, no. 7/8, pp. 1285–1294, May-June 2005, doi:10.1016/j.camwa.2004.02.012. Available as TICAM REPORT 03/48, Nov-2003.

11. L. E. García-Castillo, I. Gómez-Revuelto, F. Sáez de Adana, and M. Salazar-Palma, "A finite element method for the analysis of radiation and scattering of electromagnetic waves on complex environments," *Computer Methods in Applied Mechanics and Engineering*, vol. 194/2-5, pp. 637–655, Feb. 2005.

12. I. Gómez-Revuelto, L. E. García-Castillo, M. Salazar-Palma, and T. K. Sarkar, "Fully coupled hybrid method FEM/high-frequency technique for the analysis of radiation and scattering problems," *Microwave and Optical Technology Letters*, vol. 47, no. 2, pp. 104–107, Oct. 2005.

13. L. E. García-Castillo, D. Pardo, I. Gómez-Revuelto, and L. F. Demkowicz, "A two-dimensional self-adaptive *hp*-adaptive finite element method for the characterization of waveguide discontinuities. Part I: Energy-norm based automatic *hp*-adaptivity," *Computer Methods in Applied Mechanics and Engineering*, vol. 196, no. 49–52, pp. 4823–4852, Nov. 2007, doi:10.1016/j.cma.2007.06.024.

14. L. E. García-Castillo, D. Pardo, L. F. Demkowicz, and C. Torres-Verdín, "A two-dimensional self-adaptive *hp*-adaptive finite element method for the characterization of waveguide discontinuities. Part II: Goal-oriented *hp*-adaptivity," *Computer Methods in Applied Mechanics and Engineering*, vol. 196, no. 49–52, pp. 4811–4822, Nov. 2007, doi:10.1016/j.cma.2007.06.023.

15. I. Gómez-Revuelto, L. E. García-Castillo, D. Pardo, and L. F. Demkowicz, "A two-dimensional self-adaptive *hp* finite element method for the analysis of open region problems in electromagnetics," *IEEE Transactions on Magnetics*, vol. 43, no. 4, pp. 1337–1340, Apr. 2007, doi:10.1109/TMAG.2007.892413.

16. R. Fernández-Recio, L. E. García-Castillo, I. Gómez-Revuelto, and M. Salazar-Palma, "Fully coupled multi-hybrid FEM-PO/PTD-UTD method for the analysis of scattering and radiation problems," *IEEE Transactions on Magnetics*, vol. 43, no. 4, pp. 1341–1344, Apr. 2007, doi:10.1109/TMAG.2007.892416.

17. ——, "Fully coupled hybrid FEM-UTD method using NURBS for the analysis of radiation problems," *IEEE Transactions on Antennas and Propagation*, vol. 56, no. 3, pp. 774–783, Mar. 2008.

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3. L. E. García-Castillo and M. S.-P. and, "Parámetros circuitales y de propagación de líneas de transmisión multiconductoras inhomogéneas de geometría arbitraria," in *IX Simposium Nacional de la URSI*, Las Palmas de Gran Canaria (Spain), Sep. 1994, pp. 1094–1095.

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27. I. Gómez-Revuelto, L. E. García-Castillo, F. Sáez de Adana, L. de Haro, and M. Salazar-Palma, "Nuevo método híbrido MEF-PO en $3D$ para el análisis de problemas de radiación y scattering," in *XIX Simposium Nacional de la URSI*, Universitat Ramon Llull, Barcelona (Spain), sep 2004, sesión "Electromagnetismo II", 4 pag CDROM.

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38. D. García-Doñoro, L. E. García-Castillo, and I. Gómez-Revuelto, "GiDtohp: Interfaz basada en preprocesador GiD para modelado geométrico con adaptatividad automática *hp*," in *XXIII Simposium Nacional de la URSI*, Madrid (Spain), sep 2008, sesión II "Electromagnetismo II", 5 pag CDROM.

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41. R. Durán-Díaz, R. Rico, L. E. García-Castillo, I. Gómez-Revuelto, and J. A. Acebrón, "Analysis of scattering and radiation of electromagnetic waves via a parallelized hybrid finite element-boundary integral method," in *XXIV Simposium Nacional de la URSI*, Santander (Spain), sep 2009, sesión I "Electromagnetismo I", 4 pag CDROM.

42. D. García-Doñoro, Y. Zhang, W. Zhao, T. K. Sarkar, L. E. García-Castillo, and M. Salazar-Palma, "Interfaz basada en GiD para simulador electromagnético MoM," in *XXIV Simposium Nacional de la URSI*, Santander (Spain), sep 2009, sesión VII "Electromagnetsimo I", 4 pag CDROM.

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49. C. M.-L. Sánchez, I. Martínez-Fernández, and L. E. Garcia-Castillo, "Simulación paramétrica distribuida con HFSS," in *XXVII Simposium Nacional de la URSI*, Elche (Spain), sep 2012.

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51. I. Martinez-Fernandez and L. E. Garcia-Castillo, "Experiencia del uso de un cluster de alto rendimiento en un grupo de investigación," in *XXVIII Simposium Nacional de la URSI*, Santiago de Compostela, Spain, sep 2013, sesión "Electromagnetismo", 4 pag CDROM.

52. C. G. Muñoz, A. A. Martín, I. M. Fernández, and L. E. Garcia-Castillo, "Plataforma Web de simulación remota en un cluster de computación científica,"

in *XXVIII Simposium Nacional de la URSI*, Santiago de Compostela, Spain, sep 2013, sesión "Electromagnetismo", 4 pag CDROM.

53. D. Garcia-Doñoro, I. Martinez-Fernandez, and L. E. Garcia-Castillo, "HOFEM: Simulador electromagnético basado en el método de los elementos finitos," in *XXVIII Simposium Nacional de la URSI*, Santiago de Compostela, Spain, sep 2013, sesión "Electromagnetismo", 4 pag CDROM.

54. R. M. Barrio-Garrido, L. E. García-Castillo, I. Gómez-Revuelto, and M. Salazar-Palma, "Medidas experimentales de la complejidad computacional de un codigo autoadaptativo *hp* para problemas abiertos acelerado mediante ACA," in *XXVIII Simposium Nacional de la URSI*, Santiago de Compostela, Spain, sep 2013.

55. A. Amor and L. E. García-Castillo, "Implementation of the second-order Nédélec curl-conforming prismatic element for computational electromagnetics," in *XXX Simposium Nacional de la URSI*, Pamplona, Spain, sep 2015.

OTHER RESEARCH ACTIVITIES

STAYS IN FOREIGN RESEARCH CENTERS

- ❑ Three granted stays in **Syracuse University, New York, USA** (Department of Electrical and Computer Engineering) under the supervision of **Prof. T. K. Sarkar**:

  1. October 1st, 1991 – December 30th, 1991

     Application of wavelet type basis functions and multiresolution analysis to the numerical solution of Maxwell equations.

  2. November 7th, 1994 – February 4th, 1995

     Application of the Matrix Pencil Method to the calculation of scattering parameters of microwave structures and analysis of radar data.

  3. November 14th, 1995 – February 14th, 1996

     Development of a new iterative technique for the 3D analysis of radiation and scattering problems using the Finite Element Method.

     Application of the Hilbert transform to the frequency domain extrapolation of signals corresponding to several electromagnetic phenomena.

- ❑ Granted stay at **The Institute for Computational Engineering and Sciences (ICES)** (formerly Texas Institute for Computational and Applied Mathematics (TICAM)), University of texas at Austin, Austin, Texas, USA, as **J. T. Oden Visiting Faculty Fellow**

  Supervisor: **Leszek F. Demkowicz**

  Duration: March 1st, 2003 – September 1st, 2003

- ❑ Granted stay at **The Institute for Computational Engineering and Sciences (ICES)**, University of texas at Austin, Austin, Texas, USA, as **J. T. Oden Visiting Faculty Fellow**

  Supervisor: **Leszek F. Demkowicz**

  Duration: April 14th, 2007 – April 29th, 2007

- ❑ **University of Florida** (Deparment of Mathematics)

  Supervisor: **Jayadeep Gopalakrishnan**

  Duration: 19 de Julio de 2008 - 30 de Julio de 2008

- ❑ **Institute for Computational Engineering and Sciences (ICES)**

  Supervisor: **Leszek F. Demkowicz**

Duration: 13 de Septiembre de 2008 - 27 de Septiembre de 2008

- ❑ **Basque Center for Applied Mathematics (BCAM)**

  Supervisor: **David Pardo Zubiaur**

  Duration: 16 de Febrero de 2009 - 19 de Febrero de 2009

- ❑ **AGH University of Science and Technology** (Dep. of Computer Science)

  Supervisor: **Maciej Paszynski**

  Duration: May 14th, 2012 - May 21th, 2012

- ❑ Granted stay at the **Institute for Computational Engineering and Sciences (ICES)**, University of Texas at Austin, Austin, Texas, USA, as **J. T. Oden Faculty Fellow**

  Supervisor: **Leszek F. Demkowicz**

  Duration: September 1st, 2012 - June 15th, 2013

- ❑ **Basque Center for Applied Mathematics (BCAM)**

  Supervisor: **David Pardo Zubiaur**

  Duration: June 9th, 2014 - June 13th, 2014

SUPERVISOR OF PH. D THESIS

1. I. Gómez Revuelto, "Técnica híbrida FEM-(PO+PTD) para el análisis de problemas electromagnéticos de radiación y dispersión," Ph.D. dissertation, Universidad Politécnica de Madrid, Sep. 2004.

2. R. Fernández Recio, "Método híbrido FEM-UTD para el análisis de estructuras radiantes en entornos complejos," Ph.D. dissertation, Universidad de Alcalá, Dec. 2007.

3. D. García Doñoro, "A new software suite for electromagnetics," Ph.D. dissertation, Universidad Carlos III de Madrid, Jul. 2014, coadvised with Tapan K. Sarkar.

4. R. M. Barrio Garrido, Ph.D. dissertation, (in progress; start in 2006). Topic: Fast integration methods with *hp*-Adaptivity for Electromagnetic Problems.

5. I. Martínez Fernández, (in progress; start in 2011). Topic: Electromagnetic Analysis of Periodic Type Finite Estructures using the Finite Element Method.

6. A. Amor Martínez, (in progress; start in 2012). Topic: Advanced Techniques in Scientific Computation. Adaptive *hp* Methods in Electromagnetics.