

Resumen curricular del Dr. Edmundo Antonio Gutiérrez Domínguez

Enero 2016*

I.-Formación académica

- Licenciatura en electrónica en la facultad de fisicomatemáticas de la Universidad Autónoma de Puebla en 1985.
- Maestría en electrónica en el INAOE en 1988 (*“Diseño y fabricación de un circuito integrado CMOS, digital-analógico, y analógico-digital”*)
- Maestría en Cs. Aplicadas en la Universidad Católica de Leuven (Bélgica) en 1990 (*“D.C. characteristics of CMOS inverters and pass transistors”*)
- Doctorado en Cs. Aplicadas en la Universidad Católica de Leuven en 1993. Graduado con *magna cum laude* (*“Electrical performance of submicron CMOS technologies from 300 K to 4.2 K”*)

II.- Experiencia profesional, administrativa, y directiva

- Investigador titular categoría C en el departamento de electrónica del INAOE desde 1993 con SNI nivel 2.
- Investigador invitado en la Universidad Simon Fraser de Vancouver (Canadá) en 1996.
- Investigador invitado en la Universidad de Sao Paulo (Brasil) en 1996
- Investigador invitado en la Universidad Técnica de Viena (Austria) en 2002
- Coordinador del departamento de electrónica del INAOE en 1999
- Gerente de diseño del *Motorola Mexico Center for Semiconductor Technology*, Puebla, México en 2000.
- Director técnico del *Intel Systems Research Center*, Guadalajara, México en 2005.
- Secretario del Colegio de Personal Académico del INAOE, 2014-2015.

III.- Producción científica (lista selecta de artículos científicos de un total de 52 en JCR)

1. G. A. Rodríguez-R., **E. A. Gutiérrez-D.**, L. A. Sarmiento-R., Z. Stanojevic, H. Kosina, F. Guarín, and P. García-R., *“Experimental and simulation results of magnetic modulation of gate oxide tunneling current in nano-scaled MOS transistors”*, IEEE Electron Device Letters, Vol. 36 , No. 4 , April, 2015, pp. 387-389.
2. G. A. Rodríguez-R., **E. A. Gutiérrez-D.**, L. A. Sarmiento-R., Z. Stanojevic, H. Kosina, F. Guarín, and P. García-R., *“Thermo-magnetic effects in nano-scaled MOSFET: an experimental, modeling, and simulation approach”*, IEEE Journal of the Electron Devices Society, Vol, 3, No. 2, 2015, pp. 78-84. DOI:10.1109/JEDS.2015.2390629.
3. Agustín L. Herrera-May, Jesús A. Tapia, Saúl M. Domínguez-Nicolás, Raúl Juárez-Aguirre, **Edmundo A. Gutiérrez-D.**, Amira Flores, Eduard Figueras, Elias Manjarrez, *“Improved detection of magnetic signals by a MEMs sensor using stochastic resonance”*, PlosOne Open Journal, October 2014, Volume 9, Issue 10, e109534, pp. 1-8, doi:10.1371/journal.pone.0109534.
4. J. Molina, J. L. Sanchez-S., C. Zuñiga, E. Mendoza, R. Cuahtecotzi, G. García-P., **E. A. Gutiérrez**, E. R. Bandala, *“Low-temperature processing of thin films based on rutile TiO₂ nanoparticles for UV photocatalysis and bacteria inactivation”*, Journal of Materials Science, September 2013, on-line versión DOI 10.1007/s10853-013-7761-3. ISSN (Online): 1573-4803.
5. E. Torres-R., R. Torres-T., and **E. A. Gutiérrez-D.**, *“Identifying the diffusion and drift*

- conduction regions in MOSFETs through S-Parameters*”, in IEEE Trans. On Electron Devices, Vol. 60, No. 3, March 2013, pp. 1288-1291.
6. Saúl M. Domínguez, R. Juárez-Aguirre, A. L. Herrera-May, P. García-R., E. Figueras, **E. Gutiérrez**, J. A. Tapia, A. Trejo, E. Manjarrez, “*Respiratory magnetogram detected with a MEMs device*”, in Intl. Journal of Medical Sciences, Vol. 10, 2013, pp. 1445-1450.
 7. **E. A. Gutiérrez-D.**, E. Póndigo de los A., V. H. Vega-G., and F. Guarín, “*Observation of asymmetric magnetoconductance in strained 28-nm Si MOSFETs*”, IEEE Electron Device Letters, Vol. 33, No. 2, February 2012, pp. 254-256.
 8. **Invited Review Paper: Edmundo A. Gutierrez-D.**, “*Eye on Mexico: Public support for science is high, but transition to a research-based economy remains the challenge*”, Elsevier The Academic Executive Brief, Vol. 1, Issue 2, 2011, pp. 12-14.
 9. **Edmundo A. Gutierrez-D.**, J. Molina, et al, “*Magneto-modulation of gate leakage current in 65nm nMOS transistors: Experimental, modeling, and simulation results*”, in Solid-State Electronics, Vol. 54, issue 9, pp. 1022-1026, September 2010.
 10. A. Garcia-B., V. Grimalsky, **Edmundo A. Gutiérrez-D.**, and V. Palankovski, “*Nonstationary effects of the space charge in semiconductor structures*”, Journal of Applied Physics, Vol. 105, 2009, pp. 074501-1 to 074501-6.
 11. Rodrigo Rodríguez-Torres, **Edmundo A. Gutiérrez-Domínguez**, Robert Klima, and Siegfried Selberherr, “*Analysis of Split-Drain MAGFET’s*”, IEEE Transactions on Electron Devices, Vol. 51, No. 12, December 2004, pp. 2237-2245.
 12. **E. A. Gutiérrez-D.**, S. V. Koshevaya, and M. J. Deen, “*A 4.2 K CMOS Optical Detector*”, Cryogenics, Vol. 38, Issue 9, pp. 943-945, October, 1998.

IV.- Lista selecta de conferencias internacionales arbitradas e invitadas (de un total de 72).

1. Erika Póndigo de los A., **Edmundo A. Gutierrez-D.**, J. Molina-R., and Fernando Guarín, “*Non-homogeneous space mechanical strain induces asymmetrical magneto-tunneling conductance in MOSFETs*”, IEEE ESSDERC’2014, Venice, Italy, September 2014, pp. 90-93.
2. E. A. Gutiérrez-D., E. Póndigo de los A., V. H. Vega-G., G. Rodríguez-R., H. Uribe-V., O. Huerta-G., and J. Molina-R., “*Atomistic magnetoconductance effects in strained Fets*”, invited talk at the 28th Symposium on Microelectronics Technology and Devices SBMIcro2013, Curitiba, Brazil, 2-6 September, 2013.
3. Victor H. Vega-G., Edmundo A. Gutiérrez-D., and Fernando Guarín, “*A negative differential resistance effect implemented with a single Mosfet from 375 K down to 80 K*”, 43rd IEEE ESSDERC, September 16-20, 2013, Bucharest, Romania.
4. **E. A. Gutiérrez-D.**, E. Póndigo de los A., Victor H. Vega-G., and F. Guarín, “*Identification of vector gate current components in strained 28nm high-k pFETs*”, presented at the IEEE Semiconductor Interface Specialists Conference SISC 2011, Vol. 42, Arlington, VA, USA, September 1-3, 2011, pp. P11.
5. **Edmundo A. Gutiérrez-D.**, et al, “*Experimental evidence of unconventional room-temperature quantum Hall effect (RTQHE) in 65nm Si nMOSFETs at very low magnetic fields*”, presented at the ESSDERC’2010 Conference, Seville, Spain, September 14, 2010, pp. 178-181.
6. **Edmundo A. Gutierrez-D.**, J. Molina-R., P. J. Garcia-R, J. Martinez-C., F. Guarín, “*Magnetic field induced gate leakage current in 65nm nMOS transistors*”, published in the Proceedings of the IEEE ESSDERC 2009 Conference, pp 185-188, Athens, Greece, 14-18, September, 2009.
7. **Invited Conference E. A. Gutiérrez-D.**, “*Unconventional room-temperature quantum Hall effect in low dimensional MOSFETs*”, given at the Institute for Microelectronics of the

- Technical University of Vienna, Austria, May 29, 2010.
8. **Invited Conference E. A. Gutiérrez-D.**, "*Room temperature magneto-quantum oscillations in Si MOSFETs*", given at the Universitat Rovira I Virgili, Tarragona, Spain, September 20, 2010.
 9. **Invited Conference** (As IEEE Distinguished Lecturer) **E. A. Gutiérrez-D.**, "*Characterization and modeling of nanoscopic semiconductor devices*", Technische Universität Wien, Austria, July 18, 2012.
 10. **Invited Conference** (As IEEE Distinguished Lecturer) **E. A. Gutiérrez-D.**, "*Characterization and modeling of nanoscopic semiconductor devices*", Institute of Electrical Engineering, Slovak Academy of Sciences, Bratislava, Slovakia, July 19, 2012.

V.- Libros editados y co-autoreados.

- 1.- **Edmundo A. Gutierrez-D.**, M. Jamal Deen and Cor Claeys, Editors, "*Low Temperature Electronics: Physics, Devices, Circuits and Applications*", Academic Press, New York, 964 pages (2001). ISBN:0123106753.
- 2.- **Edmundo A. Gutiérrez-D.** (Editor and co-author), S. Selberherr, V. Sverdlov, F. Guarin, E. Miranda, S. Rauch, F. Gamiz, A. Torres-J., J. Molina-R., and P. J. García-R., "*Nano-scaled semiconductor devices; Physics, modeling, and applications*", 565 pages, a ser publicado en mayo de 2016 por IET Press, Inglaterra.

VI.- Recursos humanos generados

Tesis de maestría

1. "Development of a Process for Local Oxidation in Silicon", Ignacio Zaldivar H., May 1995. INAOE, Puebla, Mexico.
2. "A silicon based photo detector for 4.2 K operation", Margarita Tecpoyotl T., March 1997. INAOE, Puebla, Mexico.
3. "Design and characterization of CMOS analog circuits for low temperature operation" (in spanish), Alejandro Mariscal Magaña, July 1997. INAOE, Puebla, Mexico.
4. "Design, fabrication and characterization of a Field-Effect-Optical-Transistor", Ma. de la luz García C., January 2001. INAOE, Puebla, Mexico.
5. Héctor Manuel Uribe Vargas, "*Analysis and modeling of transmission, reflection, and resonance in 28nm MOS transistors*", September 27, 2013.
6. Oscar Vicente Huerta González, "*Hole and electron contribution to the magneto-transport of nano-scaled MOS transistors*"- February 19, 2014.

Tesis de doctorado

1. Oscar Huerta G, "Caracterización y modelado de la degradación eléctrica de transistores MOS nanométricos bajo la influencia de campo magnético", Septiembre 2014, en proceso.
2. Adrián Tec Chim, "Análisis teórico de la magnetocundancia en dispositivos semiconductores de escala atómica", Septiembre 2014, en proceso.
3. Gabriela Alejandra Rodríguez Ruiz, "*Tridimensional simulation of time-dependent electromagnetic effects in nano-scaled semiconductor devices*", February 20, 2015.
4. Victor Hugo Vega González, "*Analysis of quantum electromagnetic effects in low dimensional MOSFETs*", June 2014.
5. Erika Póndigo de los Ángeles, "*Characterization and modeling of the multidirectional gate current in nano-scales MOS transistors*", June 2014.
6. "Analysis and modeling of high-frequency substrate losses in CMOS integrated circuits",

- by Emmanuel Torres R., in co-supervision with Reydezel Torres T. INAOE, **Concluded** December 15, 2008.
7. "Non-stationary effects of the space charge in semiconductor structures", By Abel García Barrientos, INAOE, **Concluded** December 15, 2006.
 8. "3D Modeling and simulation of a magnetic sensor MAGFET", by Rodrigo Rodriguez, thesis co-supervised with S.Selberherr, Technical University of Vienna, Austria. **Completed** in May 2003.
 9. "Development of a high-frequency MOSFET simulator based on macromodelling", by Rodrigo Rodríguez-T., Co-supervised with Dr. Arturo Sarmiento-R.. **Concluded** in March 2002.
 10. "Analysis, modeling, design and testing of a magnetic detector based on a SiGe alloy", by Pedro J. García R.. Supervised by Dr. Edmundo Gutiérrez. **Concluded** in August 2000.
 11. "Interaction of electromagnetic waves with silicon surface integrated pin structures", by Margarita Tecpoyotl T.. Co-supervised with Dr. Svetlana Koshevaya. **Concluded** in December 1999.
 12. "A CMOS-compatible micromachined microphone", by Federico Sandoval I.. This thesis was carried out under the collaboration agreement between INAOE and the Centro Nacional de Microelectrónica CNM, Barcelona, Spain. **Concluded** in May 22, 1998.
 13. "Low-Temperature Modeling and Simulation of Semiconductor Devices", by Javier de la Hidalga W.. **Concluded** in September 23 1998.
 14. "Silicon based photodetectors", **concluded** in February 1997, by Alfonso Torres J.. This thesis was carried out under a collaboration agreement between INAOE and IMEC (Leuven, Belgium).
 15. "High frequency characterization and modeling of submicron MOS devices", by Roberto Murphy A.. This thesis was carried out under a collaboration agreement between INAOE and IMEC (Leuven, Belgium). **Concluded** in July 1997.

VII.- Ubicación de los estudiantes egresados bajo mi dirección

- 1.- Dr. Alfonso Torres J., departamento de electrónica del INAOE, responsable del LiMEMs.
- 2.- Dr. Roberto S. Murphy A., Director de Investigación del INAOE.
- 3.- Dr. Javier de la Hidalga W., departamento de electrónica del INAOE.
- 4.- Dra. Margarita Tecpoyotl T., CIICAP, UAEM, Cuernavaca, Morelos.
- 5.- Dr. Federico Sandoval I., CINVESTAV, Guadalajara.
- 6.- Dr. Pedro J. García R., Facultad de Ingeniería, Universidad Veracruzana.
- 7.- Dr. Rodrigo Rodríguez T., departamento de investigación en desarrollo de memorias, Intel, Munich, Alemania.
- 8.- Dr. Abel García B., Facultad de Cs. Aplicadas, UASLP.
- 9.- Dr. Emmanuel Torres R., ITESM, Campus Puebla.
- 10.- Dra. Erika Póndigo de los A., Inst. Tecnológico de Salina Cruz, Oaxaca.
- 11.- Dr. Victor H. Vega G., investigación y desarrollo de tecnologías de 7 nm, IMEC, Bélgica.
- 12.- Dra. Gabriela A. Rodríguez R., Universidad del Valle de México, Puebla.

VIII.- Proyectos de investigación

1. Conacyt grant project leader: "Analysis and modeling of 30 GHz and above signaling in Silicon-package-PCB systems". Approved in October 2009 for the 2010-2011 period of time, with a total fund of \$ 1,576,000.00 Mexican pesos.

2. Mexico-Spain European Commission grant project leader: *"Electromagnetic emission and interference in CMOS integrated circuits built with nanometric technologies"*, approved in June 2009 for the 2010-2011 period of time. Funds are granted for human mobility of students and researchers.
3. IBM-INAOE Joint Study Agreement "Physics of carrier transport, trapping, detrapping in conventional and high-K metal gate devices in bulk and SOI semiconductor technologies", 2011-2015.
4. Proyecto de redes temáticas de colaboración CONACyT 2011: "Implementación de sensores en tecnología MEMs (Microelectromechanicals Systems) y MOSFET (Metal-Oxide-Semiconductor Field Effect Transistor) para aplicaciones de fisiología y medicina". 2012-2013.
5. Coordinator of the university-industry R&D project *An a:SiGe amorphous 1 ps BiCMOS-compatible optical sensor*, MOTOROLA-INAOE, 2001.
6. Main coordinator of the international research network ALFA *"Semiconductor devices, circuits & systems"*, supported by the European Community. Participants: University of Sao Paulo (BRASIL), INAOE (MEXICO), IMEC (BELGIUM), INPG (FRANCE), Technical University Vienna (AUSTRIA). Concluded in 1999.
7. Edmundo A. Gutierrez-D, "A μ Tesla SiGe magnetic sensor", Research Grant CONACyT-Mexico, 1998.
8. Member of the Research network MOST sponsored by the European Commission. Members: University of Balearic Islands (Spain), Technological Institute of Toulouse (France), Technical University of Ilmenau (Germany), Simon Bolivar University (Venezuela), and INAOE (Mexico), 1997.
9. *"Characterization and Design of CMOS Devices and Circuits for High-Frequency Applications"*, approved by CONACyT-México, 1995.
10. Binational project between Mexico and Belgium *"High frequency characterisation of submicron CMOS devices"*, supported by CONACyT, 1994.
11. CONACyT Research Project: *"Magneto and quantum effects in Si and SiGe"* approved by CONACyT in December 2005. To be executed 2006-2008.
12. **Intel** Research Grant, *"Addressing silicon innovation through characterization, modeling, analysis, and design of compact-space and energy-efficient chip-to-chip signaling, on-die RFI scanning, and self-calibrated on-die temperature solutions for computing platforms"*, 2006-2008, \$ 75,000.00 USD.

IX.-Distinciones

- 1.- SNI nivel 2
- 2.- IEEE (The Institute for Electrical and Electronics Engineers) senior member
- 3.- IEEE Electron Device Letters Associate Editor
- 4.- IEEE Electron Devices Society Distinguished Lecturer.
- 5.- Distinguido como profesor invitado en Simon Fraser University, Vancouver (Canadá), Universidad de Sao Paulo (Brasil), y Universidad Técnica de Viena (Austria).
- 6.- Como reconocimiento al nivel de trabajo doctoral de mi estudiante Victor H. Vega G., IBM le otorgó el IBM student fellowship, un premio que solo se entregó a 5 personas a nivel mundial.

* El CV completo está disponible cuando se solicite.