



AMAURY ALVAREZ CRUZ(Alvarez, A. C.)

CURRICULUM VITAE

October, 2016

Education

2005, Doctor in Mathematic, Fluid Dynamics Laboratory, National Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brasil.

1997, Master in Mathematic Sciences,(Differential Equation Department), Havana University, Cuba.

1993, Bachelor in Mathematic Sciences, Differential Equation Department, Havana University, Cuba.

Professional Activities

- June 30, 2014 to August 2016, Visiting Professor, Fluid Dynamics Laboratory, IMPA, Brasil.
- October 24-28, 2016, Visiting Professor, Universidade de Juiz de Gora, UFJF.
- December 4-6, 2014, Visiting Professor, Universidade de Juiz de Gora, UFJF.
- September 28 to October 4, 2015, Visiting Professor,Universidad de Santiago de Chile, Chile.
- November 25 to December 20, 2013 Visiting Professor,Universidad de Santiago de Chile, Chile.
- April 1-June 30, 2012, Visiting Professor, Fluid Dynamics Laboratory, IMPA, Brasil.
- November 1-December 16, 2011, Visiting professor, Laboratoire COVACHIM, Université des Antilles et de la Guyane, Pointe-à-Pitre, France.
- 2009-2012, Assistant Researcher, Risk Group of the Environmental Agency. Sciences, Technology and Environmental Ministry, Cuba.
- 2005-2008, Director of Oceanology Institute, Environmental Agency. Sciences, Technology and Environmental Ministry, Cuba.

- 2005-2012, Research fellow of the Fluid Dynamics Laboratory, National Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brasil.
- August, 2005, Visiting Professor, Fluid Dynamics Laboratory, National Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brasil.
- December, 2007, Visiting Professor, Université des Antilles et de la Guyane, Pointe-à-Pitre, France.
- July-August 2007, Visiting Professor, Fluid Dynamics Laboratory, National Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brasil.
- 2001-2005, Doctor in Mathematical Student, Fluid Dynamics Laboratory, National Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brasil.
- 1993-2000, Researcher and Specialist in Mathematical modeling, Oceanology Institute, Environmental Agency, Cuba.
- 1994-1997, Master in Science Student, University Havana, Cuba.

Research Interests

- Inverse Problems
- Mathematical and Computational Modeling
- Mathematical Problems in Coastal Processes and Oceanography
- Computational Engineering
- Numerical Analysis
- Mathematical modeling of fluid flow in porous medium
- Mathematical Problems in Petroleum Engineering
- Conservation laws

Courses: Taught at Graduate Level

- Introduction to Inverse Problem, Havana University,2010.
- Mathematical modelling of coastal flooding, Centro de Estudios Ambientales de Cienfuegos. Cuba.

Projects, Grants

Projects related to the mathematical modeling of the Coastal Processes.
 Coastal recovery of Kawama Punta Blanca. Varadero.(1994, Project Co-Chair).
Oceanology Institute, Environmental Agency, Sciences Technology and Environmental Ministry.

Recovery and regeneration of Varadero Beach. (1995-1997, Project Co-Chair).
Oceanology Institute, Environmental Agency. Sciences Technology and Environmental Ministry.

Emergency plan for the protection of tourist facilities from the extreme erosion events. Varadero Beach. (1996-1997,Project Chair). *Oceanology Institute, Environmental Agency. Sciences Technology and Environmental Ministry.*

Nourishment of Sand. Varadero Beach. (1998, Project Co-Chair). *Oceanology Institute. Environmental Agency. Sciences Technology and Environmental Ministry.*

Evaluation of the erosion processes on the Interior Beaches of Cuba.(1997-1998, Project Co-Chair). *Oceanology Institute. Environmental Agency. Sciences Technology*

and Environmental Ministry.

Feasibility of three artificial beaches in the Republic of Haiti.(1999,Project Co-Chair). *Oceanology Institute. Environmental Agency. Sciences Technology and Environmental Ministry.*

Recuperation of the Melia Varadero Beach Sector.(2001,Project Co-Chair). *Oceanology Institute. Environmental Agency. Sciences Technology and Environmental Ministry.*

Projects with tasks related to the mathematical modeling in Oceanography

Oceanographic Processes and their relation with pelagic species of commercial interest. Integration. (2006-2008,Project Co-Chair). *Oceanology Institute. Environmental Agency. Sciences Technology and Environmental Ministry.*

Participation in projects with tasks that they related with mathematical modeling of the effects of the climatic changes

Waves and Storm surge during extreme meteorological events. Macroproject of Climate Change, Cuba. Project 7.(2009-2014,Project Chair). *Oceanology and Meteorology Institute. Environmental Agency. Sciences Technology and Environmental Ministry.*

Macroproyecto Inundaciones costeras producidas por la surgencia y oleaje en la situación actual y el escenario previsto para el 2050 y 2100. (2009-2014)*Oceanology and Meteorology Institutes. Environmental Agency. Sciences Technology and Environmental Ministry.*

Awards and Honors

- 1990, Winner in Mathematical modeling Olympiad, Student FORUM, Villa Clara, Cuba.
- 1993, Best academic student Award, Havana University, Cuba.
- 1993, Gold Medal Diploma Award, Havana University, Cuba.
- 1997, Excellent and Special Distinction FORUM. Excellent result of the Sciences, Technology and Environmental Ministry (CITMA), Cuba.
- 1997, Lead of the Future Award, UJC, Cuba
- 2004, Best Student Award, NOTA 10 FAPERJ, National Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brasil.
- 2005, Prize of the Academy of Sciences of Cuba. Excellent result of the Academy of Sciences of Cuba.

Graduate Students

Bachelor

- Miguel Izquierdo Alvarez, Practical and theoretical principles in the study of the swell wave surveys.Diploma. Granma Naval aAcademy, Cuba,1997.
- Valia Fonseca. Evaluation and adjustment of equilibrium profiles model to interior beaches. Diploma. Granma Naval Academy, Cuba, 1998.

Ph. D.

-Alina Rita Gutiérrez Delgado. Dispersion and chaos of passive particles in southwest region of Cuba, 2011. Instituto de Oceanología, Cuba.

Memberships in Editorial Boards of International Journals

2008-2012, Reviewer of Journal of Coastal Research.

2012-, Reviewer of Serie Oceanologica.

Memberships in International Societies and Scientific Committees

-1994- Memberships Cuban Societies of Mathematic.

-2005-2008, President Scientific Committees of Oceanology Institute.

Memberships in International Program/Organizing Committees

-V Convention on Environment and Development. Havana. Cuba, July 2005.

-VI Convention on Environment and Development. Havana. Cuba, July 2007.

-VII Congress of Marine Sciences - Marcuba 2007.

Invited Adresses

- Participant, Workshop of Mathematical Modeling in Coastal Zones given by the CEPYT of Spain in the Physical Institute of Planning. 1994.
- Participant, Workshop of Model hydraulic, model mathematician of the waves, given in the Hydraulics Investigations Center CUJAE by investigators of the University of Catalonia, Spain. 1997.
- Invited speaker, VI Workshop on Partial Differential Equations at National Institute for Pure and Applied Mathematics (IMPA), Brasil, july 2001.
- Participant, Workshop of Modelagem Numérica do transporte de sedimentos. UFRJ, 17-21 novembro. Rio de Janeiro, Brasil, 2003
- Participant, Workshop Leadership Development Workshop and Discussion on Marine Action Planning, IOC, Unesco, 2006, Cuba.
- Invited speaker, VII Workshop on Partial Differential Equations at National Institute for Pure and Applied Mathematics (IMPA), Brasil, july 2005.
- Invited speaker, VI Convention on Environment and Desarrollo. La Havana. Cuba, July 2007.
- Participant, Workshop Team-building for networks of Latin American scientists, IOC, Unesco, December, 2007, Brasil.
- Invited speaker, IX Workshop on Partial Differential Equations at Instituto Nacional de Matemática Pura e Aplicada (IMPA), Brasil, august 2007.
- Invited speaker, ICOR on PDE and Mathematical Biology February 15-26, 2010, La Habana, Cuba.
- Government Seychelles consultant 29 February/ 31 Mars, 2011, Victoria, Seychelles.
- Invited Speaker, X International Convention on Environmental and Development, June, 2011, La Habana, Cuba.
- Invited speaker, ICOR on PDE and Mathematical Biology March 6-9, 2012, La Habana, Cuba.
- Invited speaker, Interpore First IMPA-InterPore Conference on Porous Media Conservation Laws, Numerics and Applications IMPA, Rio de Janeiro, September, 2014 .
- Invited speaker, Interpore 2nd IMPA-InterPore Conference on Porous Media Conservation Laws, Numerics and Applications IMPA, Rio de Janeiro, October 16 - 19, 2016 .

Publications

Doctor of Sciences Dissertation:

Alvarez, A.C. Inverse problem for deep bed filtration porous media. National Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, v. c33, 31 dez. 2005. (Ph.D. Advisers: D Marchesin; Chair Scientific Committee: A. Zubelli, M. Sarkis, A. Nachbin, Pavel Bedrikovetsky)

Master in Sciences Dissertation:

Alvarez, A.C. Quasi classical approximation in wave propagation, Havana, University, 1997, Cuba. (Ph.D. Advisers: B Valiño; Chair Scientific Committee: M. Rodriguez Ricard, R. Rodriguez Ramoz, I. Lopez)

Mathematics Research Publications in International Journals

1. Valiño-Alonso, B., Alvarez, A. C. Canonical operator in the study of the propagation

of the waves. *Mathematical Sciences* (In Spanish). Vol.18, No. 1, 2000.

2. Alvarez, A. C., Valiño-Alonso, B. The Maz'ya Anniversary Collection. Book Reviews. *Operational Research*, Vol. 22, No. 3, 2001.

3. Alvarez, A.C ; Bedrikovetsky, P G ; Hime, G ; Marchesin, A O ; Marchesin, D ; Rodrigues, J R . A fast inverse solver for the filtration function for flow of water with particles in porous media. *Inverse Problems*, v. 22, p. 69-88, 2006.

4. Alvarez, A.C ; Hime, G. ; Marchesin, D. ; Bedrikovetsky, P. G. The inverse problem of determining the filtration function and permeability reduction in flow of water with particles in porous media. *Transport in Porous Media*, v. 70, p. 43-62, 2007.

5. Alvarez, A.C ; Meril, A. ; Valiño-Alonso, B. Step soliton Generalized solutions of Shallow water equations. *Journal of Applied Mathematics*, vol. 2012, Article ID 910659, 24 pages, 2012.

6. Alvarez, A.C ; Silva, J. D.; Hime, G.; Marchesin, D. Analytic regularization of an inverse filtration problem in porous media. *Inverse Problems* (Print), v. 29, p. 025006, 2013.

7. Alvarez, A.C ; Passé-Coutrin, N.; Gaspard, S. Determination of textural characteristics of carbons using scanning electronic microscopy images: comparison with mercury porosimetry data.(Dordrecht. Online), v. 20, p. 1-10 *Adsorption* , 2013.

Mathematics Modelling Research Publications in Magazines

1. Alvarez, A. C; Juanes, J.L; Garcia, C. Alternatives for the protection of tourist facilities of extreme erosion events .Serie Oceanologica, Vol. 0, No. 1, p. 1-10, 2001.

2. Trista, E.; Alvarez, A. C.; Juanes, J. L. Fonseca, V., Hernández, K. Characterization of inner beaches of Cuba. Determination of the equilibrium profile. Civil Engineering, No. 129, 2003.

3. Martell, R. ; Hernández; K. Alvarez, A. C.; Izquierdo, M. Engineers Alternatives for Creating Both artificial beach of the Hotel Melia Varadero. Serie Oceanologica, Vol. 1, No. 1, p. 1- 11, 2003.

4. Gutiérrez, A. Alvarez, A. C.; Frias, M. ; Alfonso, I. Effects of ENOS on superficial sea temperature and abundance of fish larvae in oceanic waters of Cuba. CYTED-Ibero-American Science and Technology for Development, p. 59-86, 2008.

5. Gutiérrez, A. ; Alvarez, A. C. Spatial and temporal of oceanic eddy in the southwest region of Cuba , Serie Oceanologica, in press, 2012.

6. Gutiérrez, A ; Baisre, J. ; Alvarez, A. C. Dispersion of lobster larvae in the Caribbean based on Numerical Simulations , Revista Investigaciones Pesqueras, Centro de Investigaciones Pesq, p. 67 - 76, 01 dez. 2012.

7. Gutiérrez, A. ; Alvarez, A. C. . Variabilidad espacial y temporal de los remolinos oceánicos en la región suroccidental de Cuba. Revista Serie Oceanologica, Instituto de Oceanologia, p. 1 - 20, 01 jan. 2012

9. Gutiérrez, A. ; Alvarez, A.C . Contaminación por hidrocarburos en la costa noroccidental de Cuba (Boca de Jaruco) basada en simulaciones numéricas. Revista Cubana de Meteorología, Instituto de Meteorologia, p. 148 - 164, 02 jul. 2014.

International Congresses and Conferences

1. Juanes, J.L; Trista, E.; Martell, R. ; Guerra, R. ; Hernández; K. Alvarez, A.C. Creation of artificial beach in the coastal Mariani-Lambi. Republic of Haiti. In: *V Congress of Marine Sciences*.Havana,MARCUBA2000, 2000.

2. Garcia, C ; Juanes, J.L ; Izquierdo, Miguel ; Hernández, K. ; Fonseca, V. ; Salazar, H. ; Rivas, L ; Felipe, M. ; Alvarez, A.C . Artificial Feeding of sand in Varadero. Execution and Efectividad.2000. In: V Congreso de Ciencias del Mar. *V Congress of Marine Sciences*, Havana,MARCUBA2000, 2000.

3. Trista, E. ; Alvarez, A.C ; Izquierdo, M. ; Salazar, H. Feasibility Study for the creation of three artificial beaches in the Republic of Haiti. In: *V Congress of Marine Sciences*.Havana,MARCUBA2000, 2000.

4. Alvarez, A.C.; Valiño, B. Hugoniot-Maslov Chain for nonlinear wave evolution with discontinuous depth. In: *Fourth Italian-Latin American Conference on Applied and Industrial Mathematics*, 2001, La Habana. Memorias IV Simposio de Matemática. La Habana : Artes Gráficas, 2001. p. 426-434.

5. Alvarez, A. C.; Marchesin, D. Determining permeability reduction in flow of water with particles in porous media, *VII Workshop on Partial Differential Equations*. Jun,2001. Río de Janeiro. Brasil.

6. Alvarez, A.C. ; Marchesin, D. ; Bedrikovetsky, P. ; Hime, G. ; Rodrigues, J. R. ; Siqueira, A. G. ; Souza, A. L. S. ; Shecaira, F. S. . Porous Media Deposition Damage from Injection of Water with Particles. In: 8th European Conference on the Mathematics of Oil Recovery, Germany. *Proceedings of 8th European Conference on the Mathematics of Oil Recovery*, 2002.

7. Alvarez, A. C.; Marchesin, D. A simple inverse solver for the filtration function in flow of water with particles in porous media, *VIII Workshop on Partial Differential Equations*. Jun,2003. Rio de Janeiro. Brasil.

8. Alvarez, A.C.; Martell R.; Hernandez, C. Numerical Model in wave propagation. In: *VI Congress of Marine Sciences*.Havana,MARCUBA2003, 2003.

9. Marchesin, D. ; Alvarez, A.C. ; Hime, G. ; Bedrikovetsky, P. ; Al-Abduwani, F. A. H. . The inverse problem of determining filtration function and permeability reduction in porous media. In: XXV CILAMCE. *Iberian Latin American Congress on Computational Methods*, 2004, Recife. XXV CILAMCE., 2004.

10. Alvarez, A.C ; Hime, G. ; Marchesin, D. ; Bedrikovetsky, P. The inverse problem of determining permeability reduction in flow of water with particles in porous media. In: XXVI CILAMCE. *Iberian Latin American Congress on Computational Methods*, 2005, Guarapari, Espiritu Santo. XXVI CILAMCE. , 2005.
11. Al-Abduwani, F. A. H.; Hime, G. ; Alvarez, A.C. ; Farajzadeh, R. New Experimental an modeling approach for the quantification of internal filtration. In: SPE - *6th Eurpean Formation Damage Conference*, 2005, Scheveningen. SPE - 6th Eurpean Formation Damage Conference. Scheveningen : SPE, 2005.
12. Alvarez, A.C ; Marchesin, D. ; Hime, G. Inverse Problem for Systems of Conservation Laws Modeling the Flow of Water with Particles in Porous Media. In: Eleventh International Conference on Hyperbolic Problems: Theory, Numerics and Applications, 2006, Lyon. *Proceedings of Eleventh International Conference on Hyperbolic Problems: Theory, Numerics and Applications*, 2006.
13. Alvarez, A.C.; Hime, G. ; Marchesin, D. ; Bedrikovetsky, P. Robust recovery of the filtration function for flow of water with particles in porous media, Scheveningen. *European Formation Damage Conference.2007*. SPE 107770-MS.
14. Alvarez A. C.; Hime, G.; Marchesin, P. Regularity of the filtration function inverse problem for flow in porous media, *IX Workshop on Partial Differential Equations*. Jun, 2007. Río de Janeiro. Brasil.
15. Alvarez, A.C.; Marchesin, D.; Hime, G . Analytic Regularization of an Inverse Problem for a System of Conservation Laws. In: *The 12th International Conference on Hyperbolic Problems.*, 2009, Maryland., 2009.
- 16.Gutiérrez, A. ; Alvarez, A. C. Larval dispersal in ocean waters southwest of Cuba In: *VIII Congress of Marine Sciences*.Havana,COLACMARCUBA2009, 2009.
- 17.Gutiérrez, A. ; Alvarez, A. C. Chaoticity in the oceanic waters adjacent to Cuba In: *VIII Congress of Marine Sciences*.Havana,COLACMARCUBA2009, 2009.
- 18.Alvarez, A.C.; Gutiérrez, A. Particle trajectories simulating contaminant transport in oceanic and coastal areas In: *VIII Congress of Marine Sciences*.Havana,COLACMARCUBA2009, 2009.
- 19.Alvarez, A.C.; Sarkis, M., Marchesin, D.: *Solving Mild Slope equation in Matlab with Domain decomposition method*.Winter School and 9th ICOR on PDE and Mathematical Biology February 15-26, 2010, La Habana, Cuba.
- 20.Valiño-Alonso B., Alvarez, A.C., Meril, A. : *Infinitely narrow soliton in shallow water equations*.Winter School and 9th ICOR on PDE and Mathematical Biology.February 15-26, 2010, La Habana, Cuba.
- 21.Alvarez, A.C., Lopez, E. , Gutierrez, A. *Coupling ADCIRC+SWAN in the*

estimation of coastal floodings in Cuba. X International Convention on Environmental and Development, III Colloquia on Hazard, vulnerability and risk, 2011.

22. Alvarez, A.C., Meril, A. , Valiño-Alonso B., : *Step Generalized solution of shallow water equations.* Winter School and 9th ICOR on PDE and Mathematical Biology. March 6-9, 2012, La Habana, Cuba.

23. Alvarez, A.C.; Lambert, W.J. ; Bruining, J. ; Marchesin, D. . The Riemann Solution for Carbonated Waterflooding. In: ECMOR XV 15th European Conference on the Mathematics of Oil Recovery, 2016, Amsterdam, 2016.

24. Blom, T. ; Alvarez, A.C. ; Lambert, W.J. ; Marchesin, D. ; BRUINING, J. . Low Salinity Carbonated Waterflooding. In: ECMOR XV 15th European Conference on the Mathematics of Oil Recovery, 2016, Amsterdam, 2016.

Papers in Books

1. Alvarez, A.C.; Marchesin, D.; Hime, G . Analytic Regularization of an Inverse Problem for a system of conservation laws. In Book: Hyperbolic Problems: Theory, Numerics and Applications. Editors: Eitan Tadmor, Jian-Guo Liu, Athanasios E. Tzavaras *Proceeding in Symposia in Applied Mathematics. American Mathematical Society.*, Volume 67, Maryland., 2010.

Cuba Conferences

1. Alvarez, A. C. Determination of points of concentration of height wave with the method of quasi classical approximation, COMPUMAT 1997. *VI National Congress of the Cuban Society of Mathematics and Computer Science.*

2. Gutiérrez, A. ; Alvarez, A. C. Effect of SST on the spawning commercial species, *Fishing 2007*, Cuba.

3. Gutiérrez, A. ; Alvarez, A. C. The ocean eddies: physical mechanisms of particle retention, *Havana Green*, 2008.

Report of investigation of National Institute for Pure and Applied Mathematics (IMPA)

1. Alvarez A.C.; Marchesin. D. A simple inverse solver for the filtration function in flow of water with particles in porous media. Report E002 IMPA, www.impa.br, 2005.

2. Alvarez A. C.; Hime, G.; Marchesin, D.; Bedrikovetsky, P. Robust fast recovery of the filtration function for flow of water with particles in porous media. Report E006 IMPA, www.impa.br, 2007.

3. Alvarez A. C.; Hime, G.; Marchesin, P. Regularity of the filtration function inverse problem for flow in porous media. Report E010 IMPA, www.impa.br, 2008.

Report of investigation of Institute of Oceanology

1. Alvarez, A.C., López, O., Juantorena, Y., Pérez Osorio, R., P. Casals, Gutiérrez, A., Cecilia, G. C., G. (2010). Oleaje generado por eventos meteorológicos extremos. (Tech. Rep.). Instituto de Oceanología y Instituto de Meteorología.

2. Alvarez, A.C., López, O, Cutie, F.(2011) Preliminary hazards analysis of sea level rise and coastal flooding in Seychelles islands. Climate Change for current and the projection for the years 2025, 2050 and 2100. Research report. Oceanology Institute.

3. Casals Taylor, R., Alvarez A. C., Pérez Lopez, O. E., Gutiérrez Delgado, A. R., Pérez Osorio, P. J., Guzman Menéndez, J. M., y cols. (2012). Inundación costera producida por la surgencia y el oleaje generado por eventos meteorológicos extremos. (Inf. Tec.). Instituto de Meteorología y Oceanología.

4. Tristá E., Alvarez A.C., Izquierdo M. y Salazar H. 2000. Estudio de factibilidad para la creación de playas artificiales en los sectores costeros Mariani-Lambi, Le Minoterie y Arcadins, República de Haití. Proceedings del V Congreso Internacional MARCUBA'2000. Trabajo No. 221, 22 págs.

5. Serrano, H, Alvarez A. C.,Perez, O., Herrera, I. Guerra, M.,Pacheco, E., Pacheco, S., Muinas, R,Ramirez, O., Pallar, C.,Leal, R.(2010) Estudios de peligro, vulnerabilidad y riesgo en la Zona de Desarrollo Industrial en Mariel. Group Risk. Environmental Agency.

Submitted Paper

Ms. Ref. No.: APM-D-16-00400. February 2016. Under review A.C. Alvarez, Garcia, M., Sarkis, M. The Ultra Weak Variational Formulation for the modified mild slope equation. Applied Mathematical Modelling

Paper in preparation

To submitted to Computational Geosciences journal

1. Alvarez A. C.; Lambert, W.J; Brunning, J. ; Marchesin, D. . The Riemann Solution for Carbonated Waterflooding.

2. Alvarez, A.C. Blom, T. ; Lambert, W.J. ; Marchesin, D. ; Bruining, J. . Low Salinity Carbonated Waterflooding.

To submitted to SIAM: Journal Numerical Analysis

Convergence of the regularization by conjugation method of bounded linear operator. Alvarez, A. C., Chapiro, G., García, G. C., and Moreira, C. G. T. A.

Other Professional Activities

Participation since 1994-1998 in the Mechanical and Differential Equations Seminar of the University of Havana, where has presented the themes of investigation of its institute referred to the modeling of the conditions of equilibrium in the beaches.

Researcher collaborator of National Institute of Pure and Applied mathematic (IMPA, Brazil).

Home page

<http://meissa98.impa.br>