CURRICULUM VITAE

Personal Data :

Name	:	Mahamadi Warma
Citizenship	:	United States of America (USA)
Profession	:	Professor
Address	:	George Mason University,
		Department of Mathematical Sciences, Fairfax, VA 22030, USA,
E-mail	:	mwarma@gmu.edu

Education:

Ph.D. in Mathematics,   University of Ulm, Germany,   2002

Professional Experience:

- Since January 2020: Professor. Department of Mathematical Sciences, George Mason University.

- July 2014-December 2019: Professor. Department of Mathematics, University of Puerto Rico, Rio Piedras Campus (UPRRP).

- July 2008-June 2014: Associate Professor. Department of Mathematics, UPRRP.

- August 2005-June 2008: Assistant Professor. Department of Mathematics UPRRP.

- September 2003-July 2005: Assistant Professor. Department of Mathematics, Catholic University of Eichstätt (Germany).

- February-July 2003: Postdoctoral Fellow. UPRRP.

- 1998–2002: Graduate Assistant in Mathematics: Institute of Applied Analysis, University of Ulm (Germany).

Visiting Positions:

- May 20–July 20, 2019. Visiting Professor at the "Universidad de Talca", Chile

- December 5, 2015 to January 6, 2016. Visiting Professor at the "Universidad de Santiago de Chile", Chile.

- September 15, 2015 to October 15, 2015. Visiting professor at the Basque Center for Applied Mathematics (BCAM), Bilbao, Spain.

- May 15, 2015 to June 15, 2015. Visiting professor at the Florida International University, Miami, USA.

- May 15, 2014 to June 15, 2014. Visiting professor at the University of Ulm, Germany

- November 01, 2013 to December 01, 2013. Visiting Professor at the "Universidad de Santiago de Chile", Santiago, Chile.

- June 01, 2012 to July 01, 2012. Visiting professor at the University of Metz, France.

Research Interests:

Fractional Partial Differential Equations, Nonlocal Partial Differential Equations, Evolution Equations, Linear and non linear Partial Differential Equations, Potential theory, Dirichlet forms, Feller semigroups, Control Theory of PDEs, Optimal Control of PDEs.

Teaching Experience:

A. **University of Ulm (Germany)**.

    A1. Undergraduate

- Measure theory and integration.
- Functions of a complex variable.
- Mathematics for Engineers.

B. **University of Eichstätt (Germany)**.

    B1. Undergraduate.

- Measure theory and ordinary differential equations.
- Differential equations and vector calculus.
- Linear Algebra.

    B2. Graduate

- Spectrum of differential operators in L^p-spaces.
- Analysis in Metric spaces.
- Hilbert spaces and Applications.
- Complex Analysis.

C. **University of Puerto Rico (Rio Piedras Campus)**.

    C1. Undergraduate

- Precalculus and Analytic geometry (Math 3018 and Math 3024).
- Calculus I & II (Math 3151 and Math 3152).
- Ordinary Differential Equations (Math 4009).
- Partial Differential Equations (Math 4045).
- Introduction to Complex Analysis (Math 5037).
- Advanced Calculus (Math 5201)

    C1. Graduate

- Complex Analysis I (Math 6301).
- Spectral Theory and Differential Equations (Math 8465).

- Complex Analysis II (Mate 8309)
- Sobolev spaces and the Laplace equation (Math 8985).
- Topics on "Potential Theory I & II" (Math 8985).
- Heat kernel and semigroups generated by elliptic operators (Math 8985).

D. **George Mason University at Fairfax**.

- Measure and Integration (Math 776): Spring 2021.
- Advanced Calculus I (Math 315): Fall 2020.
- Introduction to Advanced Mathematics (Math 290): Fall 2020.

<u>Courses created</u>:

- Topics on Potential Theory I.

- Topics on Potential Theory II.

- Heat kernel and semigroups generated by Dirichlet forms.

<u>Books</u>:

- (with C. G. Gal) Fractional-in-time semilinear parabolic equations and applications. **Springer books series: Mathématiques et Applications Vol. 84 (2020).**

<u>Publications in refereed journals</u>:

1. (with R. Ponce) Asymptotic behavior and representation of solutions to a Volterra kind of equation with a singular kernel. **Semigroup Forum, to appear.**

2. (with E. Aragones and V. Keyantuo) Approximate and mean approximate controllability properties for Hilfer time-fractional differential equations. **Vietnam Journal of Mathematics, to appear.**

3. (with C. Louis-Rose) Approximate controllability from the exterior of space time fractional wave equations. **Applied Mathematics and Optimization (2020), to appear. DOI :10.1007/s00245-018-9530-9**.

4. (with S. Zamorano) Exponential Turnpike property for fractional parabolic equations with non-zero exterior data. **ESAIM Control Optim. Calc. Var. 27 (2021), Paper No. 1, 35 pp.**

5. (with B. Claus) Realization of the fractional Laplacian with nonlocal exterior conditions via forms method. **J. Evolution Equations 20 (2020), 1597–1631. DOI: https://doi.org/10.1007/s00028-020-00567-0.**

6. (with S. Zamorano) Analysis of the controllability from the exterior of strong damping nonlocal wave equations. **ESAIM Control Optim. Calc. Var. 26 (2020), Paper No. 42, 34 pp.. DOI: https://doi.org/10.1051/cocv/2019028**.

7. (with H. Antil and D.Verma) Optimal control of fractional elliptic PDEs with state constraints and characterization of the dual of fractional order Sobolev spaces. **Journal of Optimization Theory and Applications 186 (2020), 1–23.**

8. (with U. Biccari) Null-controllability properties of a fractional wave equation with a memory term. **Evolution Equations and Control Theory 9 (2020), 399–430. DOI: 10.3934/eect.2020011**

9. (with V. Keyantuo and L. Tebou) A Gevrey class semigroup for a Thermoelastic plate model with a fractional Laplacian: Between the Euler-Bernoulli and Kirchhoff models. **Discrete and Continuous Dynamical Systems (DCDS) Series A 40 (2020,) 2875–2889. DOI: 10.3934/dcds.2020152**

10. (with H. Antil) Optimal control of fractional semilinear PDEs. **ESAIM Control Optim. Calc. Var. 26 (2020), 130. DOI: https://doi.org/10.1051/cocv/2019003**.

11. (with U. Biccari and E. Zuazua) Controllability of the one-dimensional fractional heat equation under positivity constraints. **Communications on Pure & Applied Analysis 19 (2020), 1949–1978. DOI: 10.3934/cpaa.2020086**

12. (with H. Antil and D. Verma) External optimal control of fractional parabolic PDEs. **ESAIM Control Optim. Calc. Var. 26 (2020). DOI = 10.1051/cocv/2020005**

13. (with S. Zamorano) Null controllability from the exterior of a one-dimensional nonlocal heat equation. **Control & Cybernetics 48 (2019), 417–438**

14. (with R. Chill) Corrigendum to: Dirichlet and Neumann boundary conditions for the p-Laplace operator: What is in between? **Proc. Roy. Soc. Edinburgh Sect. A 149 (2019), 16891691.**

15. (with V. Keyantuo and F. Seoanes) Fractional Gaussian estimates and holomorphy of semigroups. **Archiv der Mathematik 113 (2019), 629–647. DOI : 10.1007/s00013-019-01381-y**.

16. (with J. Gonzalez-Camus, V. Keyantuo and C. Lizama) Fundamental solutions for discrete dynamical systems involving the fractional Laplacian. **Mathematical Methods in the Applied Sciences (MMAS) 42 (2019), 4688–4711. DOI: https://doi.org/10.1002/mma.5685**

17. (with H. Antil and R. Khatri) External optimal control of nonlocal PDEs. **Inverse Problems 35 (2019), 084003, 35pp. DOI https://doi.org/10.1088/1361-6420/ab1299**.

18. (with V. Keyantuo, C. Lizama and S. Rueda). Asymptotic behavior of mild solutions for a class of abstract nonlinear difference equations of convolution type. **Advances in Difference equations (2019), 2019:251. DOI: https://doi.org/10.1186/s13662-019-2189-y**

19. Approximate controllability from the exterior of space-time fractional diffusive equations. **SIAM Journal on Control and Optimization (SICON) 57 (2019), 2037–2063. DOI: https://doi.org/10.1137/18M117145X**.

20. (with V. Keyantuo and C. Lizama) Lattice dynamical systems associated to a fractional Laplacian. **Numerical Functional Analysis and Optimization 40 (2019), 1315-1343. DOI: https://doi.org/10.1080/01630563.2019.1602542**

21. (with E. Alvarez, C.G. Gal and V. Keyantuo) Well-posedness results for a class of semilinear super-diffusive equations. **Nonlinear Analysis 1181 (2019), 24–61. DOI: https://doi.org/10.1016/j.na.2018.10.016**.

22. (with H. Antil) Optimal control of the coefficient for fractional and regional fractional p-Laplace equations: Approximation and convergence. **Mathematical Control and Related Fields 9 (2019), 1–38. DOI: 10.3934/mcrf.2019001**.

23. (with U. Biccari and E. Zuazua) Local regularity for fractional heat equations. **Recent Advances in PDEs: Analysis, Numerics and Control. SEMA-SIMAI Springer Series (2018), 223–249**.

24. On the (s, p)-Dirichlet-to-Neumann operator on bounded Lipschitz domains. **Journal of Elliptic and Parabolic Equations (2018), 223–269.**
    DOI: https://doi.org/10.1007/s41808-018-0017-2.

25. (with W. Arendt and A.F.M. ter Elst) Fractional powers of sectorial operators via the Dirichlet-to-Neumann operator. **Communication in Partial Differential Equations 43 (2018), no. 1, 1–24.**
    DOI: https://doi.org/10.1080/03605302.2017.1363229.

26. (with V. Keyantuo and C. Lizama) Existence, regularity and representation of solutions of fractional wave equations. **Electronic Journal of Differential Equations 2017 (2017), No. 222, pp. 1-42.**

27. On the approximate controllability from the boundary for fractional wave equations. **Applicable Analysis 96 (2017), 2291–2315.**
    DOI: https://doi.org/10.1080/00036811.2016.1221066.

28. (with H. Antil and J. Pfefferer) A note on semilinear fractional diffusion equation: analysis and discretization. **Mathematical Modelling and Numerical Analysis. ESAIM: M2AN 51 (2017), 2049–2067.**
    DOI: https://doi.org/10.1051/m2an/2017023.

29. (with C. G. Gal). Nonlinear elliptic boundary value problems at resonance with nonlinear Wentzell-Robin type boundary conditions. **Advances in Mathematical Physics 2017 (2017), Article ID 5196513, 20 pages.**
    DOI: https://doi.org/10.1155/2017/5196513.

30. (with U. Biccari and E. Zuazua) Addendum: Local elliptic regularity for the Dirichlet fractional Laplacian. **Adv. Nonlinear Stud. 17 (2017), 837–839. DOI: https://doi.org/10.1515/ans-2017-6020**.

31. (with U. Biccari and E. Zuazua) Local elliptic regularity for the Dirichlet fractional Laplacian. **Advanced Nonlinear Studies 17 (2017), 387–409.**
    DOI: https://doi.org/10.1515/ans-2017-0014.

32. (with C. G. Gal) Nonlocal transmission problems with fractional diffusion and boundary conditions on non-smooth interfaces. **Communication in Partial Differential Equations 42 (2017), 579–625.**
    DOI: https://doi.org/10.1080/03605302.2017.1295060.

33. (with C. G. Gal) On some degenerate non-local parabolic equations associated with the fractional p-Laplacian. **Dynamics of PDE 14 (2017), 47–77.**
DOI: https://doi.org/10.4310/DPDE.2017.v14.n1.a4.

34. (with C.G. Gal). Long-term behavior of reaction-diffusion equations with nonlocal boundary conditions on nonsmooth domains. **Zeitschrift für angewandte Mathematik und Physik ZAMP 67 (2016), no. 4, Art. 83, 42 pp.**
DOI: https://doi.org/10.1007/s00033-016-0673-8

35. (with C. G. Gal) Bounded solutions for nonlocal boundary valued problems on Lipschitz manifolds with boundary. **Advanced Nonlinear Studies 16 (2016), 529–550.**
DOI: https://doi.org/10.1515/ans-2015-5033.

36. (with V. Keyantuo and C. Lizama). Existence, regularity and representation of solutions of time fractional diffusion equations. **Advances in Differential Equations 21 (9/10) (2016), 837–886. DOI: http://projecteuclid.org/euclid.ade/1465912585**.

37. (with C. G. Gal) Elliptic and parabolic equations with fractional diffusion and dynamic boundary conditions. **Evolution Equations and Control Theory 5 (2016), 61–103. DOI: https://doi.org/10.3934/eect.2016.5.61**.

38. (with V. Keyantuo) On the interior approximate controllability for fractional wave equations. **Discrete Contin. Dyn. Syst. Ser. A 36 (2016), 3719–3739. DOI: https://doi.org/10.3934/dcds.2016.36.3719**.

39. Local Lipschitz continuity of the inverse of the fractional p-Laplacian, Hölder type continuity and continuous dependence of solutions to associated parabolic equations on bounded domains. **Nonlinear Analysis 135 (2016), 129–157.**
DOI: https://doi.org/10.1016/j.na.2016.01.022.

40. The fractional Neumann and Robin boundary condition for the fractional p-Laplacian on open sets. **NoDEA Nonlinear Differential Equations Appl. 23 (2016), 1–46.**
DOI: https://doi.org/10.1007/s00030-016-0354-5.

41. (with C. G. Gal) Transmission problems with nonlocal Wentzell type boundary conditions and rough dynamic interfaces. **Nonlinearity 29 (2016), 161–197. DOI: https://doi.org/10.1088/0951-7715/29/1/161**.

42. (wth C. G. Gal) Reaction-diffusion equations with fractional diffusion on non-smooth domains with various boundary conditions. **Discrete Contin. Dyn. Syst. Ser. A 36 (2016) 1279–1319. DOI: https://doi.org/10.3934/dcds.2016.36.1279**.

43. A fractional Dirichlet-to-Neumann operator. **Commun. Pure Appl. Anal. 14 (2015), 2043–2067. DOI: https://doi.org/10.3934/cpaa.2015.14.2043**.

44. The fractional relative capacity and the fractional Laplacian with Neumann and Robin boundary conditions on open sets. **Potential Analysis 42 (2015) , 499–547. DOI: https://doi.org/10.1007/s11118-014-9443-4**.

45. The p-Laplace operator with the nonlocal Robin boundary conditions on arbitrary open sets. **Ann. Mat. Pura Appl. 193 (2014), 203–235.**
DOI: https://doi.org/10.1007/s10231-012-0273-y.

46. (with P. Sacks) Semi-linear elliptic and elliptic-parabolic equations with Wentzell boundary conditions and L^1-data. **Discrete Contin. Dyn. Syst. Ser. A 34 (2014), 763–789. DOI: https://doi.org/10.3934/dcds.2014.34.761**.

47. (with V. Keyantuo and C. Lizama). Spectral criteria for solvability of boundary value problems and positivity of solutions of time-fractional differential equations. **Abstract Applied Analysis (2013), Article ID 614328, 11 pages**.

48. (with V. Keyantuo and C. Lizama) Asymptotic behavior of fractional order semilinear evolution equations. **Differential Integral Equations 26 (2013), 757–780**.

49. Semi linear parabolic equations with nonlinear general Wentzell boundary conditions. **Discrete Contin. Dyn. Syst. Ser. A 33 (2013), 5493–5506**.

50. (with Ciprian G. Gal) Existence of bounded solutions for a class of quasilinear elliptic systems on manifolds with boundary. **J. Differential Equations 255 (2013), 151–192**.

51. (with R. Chill) A Riesz type representation for lower semicontinuous, monotone, local functionals on $C_c(X)^+$. **Nonlinear Analysis 85 (2013), 17–22**.

52. Parabolic and elliptic problems with general Wentzell boundary conditions on Lipschitz domains. **Commun. Pure Appl. Anal. 12 (2013), 1881–1905**.

53. (with R. Chill) Dirichlet and Neumann boundary conditions for the p-Laplace operator: What is in between? **Proceedings of the Royal Society of Edinburgh, Section A 142 (2012), 975–1002**.

54. Regularity and well-posedness of some quasi-linear elliptic and parabolic problems with nonlinear general Wentzell boundary conditions on nonsmooth domains. **Nonlinear Analysis 75 (2012) 5561–5588**.

55. (with E. Alvarez-Pardo). The one-dimensional wave equation with nonlocal Robin boundary conditions. **Archiv der Mathematik (Basel) 96 (2011), 177–186**

56. Analyticity on L_1 of the heat semigroup with Wentzell boundary conditions. **Archiv der Mathematik (Basel) 94 (2010), 85–89**.

57. (with M. Biegert). Existence of solutions to some quasi-linear PDEs with generalized Robin boundary conditions. **Nonlinear Analysis 73 (2010), 1853–1863**.

58. (with M. Biegert). Some quasi-linear elliptic equations with inhomogeneous generalized Robin boundary conditions on "bad" domains. **Advances in Differential Equations 15 (2010), 893–924**.

59. (with A. Velez-Santiago). A class of quasi-linear parabolic and elliptic equations with nonlocal Robin boundary conditions. **J. Mathematical Analysis and Applications 372 (2010), 120–139**.

60. (with C. G. Gal). Well-posedness and the global attractor of some quasi-linear parabolic equations with nonlinear dynamic boundary conditions. **Differential and Integral Equations 23 (2010), 327–358**.

61. (with M. Biegert). The heat equation with nonlinear generalized Robin boundary conditions. **J. Differential Equations 247 (2009), 1949–1979**.

62. An ultracontractivity property for semigroups generated by the p-Lapalcian with nonlinear Wentzell-Robin boundary conditions. **Advances in Differential Equations 14 (2009), 771–800**.

63. (with R. Chill and V. Keyantuo). Generation of cosine families on $L^p(0,1)$ by elliptic operators with Robin boundary conditions. **Birkhaüser. Functional Analysis and Evolution Equations. 2008, 113–130**.

64. Quasilinear parabolic equations with nonlinear Wentzell-Robin type boundary conditions. **J. Mathematical Analysis and Applications 336 (2007), 1132–1148**.

65. The Robin and Wentzell-Robin Laplacians on Lipschitz domains. **Semigroup Forum 73 (2006), 10–30**.

66. (with M. Biegert). Regularity in capacity and the Dirichlet Laplacian. **Potential Analysis 25 (2006), 289–305**.

67. (with V. Keyantuo). The wave equation with Wentzell-Robin boundary conditions on L^p-spaces. **J. Differential Equations 229 (2006), 680–697**.

68. (with M. Biegert). Removable singularities for a Sobolev space. **J. Mathematical Analysis and Applications 313 (2006), 49–63**.

69. (with V. Keyantuo). The wave equation in L^p-spaces. **Semigroup Forum 71 (2005), 73–92**.

70. (with W. Arendt). The Laplacian with Robin boundary conditions on arbitrary domains. **Potential Analysis 19 (2003), 341–363**.

71. (with W. Arendt). Dirichlet and Neumann boundary conditions: What is in between? **J. Evolution Equations 3 (2003), 119–135**.

72. Wentzell-Robin boundary conditions on $C[0,1]$. **Semigroup Forum 66 (2003), 162–170**.

Publications in non refereed journals:

1. (with H. Antil) Optimal control of the coefficient for fractional p-Laplace equation: approximation and convergence. **RIMS Kôkyûroku 2090, (2018)**. http://www.kurims.kyoto-u.ac.jp/ kyodo/kokyuroku/contents/pdf/2090-08.pdf

2. (with M. Biegert). Sobolev functions whose weak derivatives are zero at the boundary. **Ulmer Seminare, University of Ulm (2002), 122–132**.

PhD Dissertation:

The Laplacian with general Robin boundary conditions. Ph.D Dissertation, **University of Ulm (Germany), 2002**.

Research papers submitted for publication:

1. (with H. Antil, T. Brown and D. Verma) Moreau-Yosida regularization for optimal control of fractional PDEs wityh state constraints: Parabolic case.

2. (with H. Antil, U. Biccari, R. Ponce and S. Zamorano) Controllability properties from the exterior under positivity constraints for a 1-D fractional heat equation.

3. (with H. Antil, C. Lizama and R. Ponce) Convergence of solutions of discrete semi-linear space-time fractional evolution equations.

4. (with C. Lizama and S. Zamorano) Exterior controllability properties of a nonlocal Moore-Gibson-Thompson equation.

Current Research Grants:

- **(PI) Control, Optimization and Transmission Problems for Nonlocal PDEs.** Army Research Office (ARO). 15 May 2020– 14 May 2023. $410,375.

- **(PI) Nonlocal PDEs: Modelling, Analysis, Control and beyond**. Air Force Office for Scientific Research (AFOSR). June 2018–May 2021. $456,493.

Recent Past Research Grants:

- **(PI) Workshop on Dynamics, Control and Numerics for Fractional PDEs**. Air Force Office for Scientific Research (AFOSR), May 2017–March 2019, $39,853.

- **(PI) Workshop on Dynamics, Control and Numerics for Fractional PDEs**. Army Research Office (ARO), March 2017–December 2018, $18,600.

- **(PI) Dynamics, Control and Numerics for Fractional Partial Differential Equations**. Air Force Office for Scientific Research (AFOSR) Award No: FA9550-15-1-0027, December 2014 to May 31, 2018, $450,438.

Referee for the following international journals:

- SICON: SIAM Journal on Control and Optimization.

- SIMA: SIAM Journal on Mathematical Analysis.

- SINUM: SIAM Journal on Numerical Analysis.

- Applied Mathematics and Optimization.

- Journal Math. Pures Appliquées.

- Complex Variables and Elliptic Equations.

- Applied Mathematics Letters.

- Journal of Physics A: Mathematical.

- Nonlinear Analysis.

- M3AS. Mathematical Models and Methods in Applied Sciences.

- Discrete Continuous Dynamical Systems, Series A.

- Discrete Continuous Dynamical Systems, Series B.

- Systems & Control Letters.

- Mathematical Methods in the Applied Sciences.

- Applied Mathematics and Computation.

- Journal of Functional Analysis.

- Journal of Differential Equations.

- Journal of Dynamics and Differential Equations.

- Journal of Mathematical Analysis and Applications.

- Journal of Evolution Equations.

- Mathematische Nachrichten.

- Zeitschrift für Angewandte Mathematik und Physik.

- Semigroup Forum.

- Applicable Analysis.

- Computational and Applied Mathematics.

- Advanced Nonlinear Studies.

- Czechoslovak Mathematical Journal.

- Kragujevac Journal of Mathematics.

- ESAIM: Control, Optimisation and Calculus of Variations.

- Advanced Nonlinear Studies.

- Communications in Partial Differential Equations.

- Electronic Journal of Differential Equations .

Reviewer:
- Amer. Math. Soc.

- Zentralblatt

Selected Invited Talks:

1. **International**

- **August 5–8, 2019**. Berlin, Germany. International Conference on Continuous Optimization (ICCOP). Controllability of the one-dimensional fractional heat equation under positivity constraints.
- **May 6–10, 2019**. Bad Herrenalb, Germany. Well-posedness results for a class of semi-linear super-diffusive equations.
- **June 2016**. University of Dresden, Germany. Local Lipschitz continuity of the inverse of the fractional p-Laplacian, Hölder type continuity and continuous dependence of solutions to associated parabolic equations on bounded domains.
- **May 2016**. University of Ulm, Germany. Fine properties of solutions of elliptic and parabolic problems associated with the fractional p-Laplace operator.
- **October 2015**. University of Ulm, Germany. What are the three classical boundary conditions for the fractional Laplace operator?
- **October 2015**. University of Zaragoza, Spain. Some Recent Progress on the Controllability of Fractional Super Diffusion Equations.
- **September 2015**. Basque Center for Applied Mathematics (BCAM), Bilbao, Spain. Some Recent Progress on the Controllability of Fractional Super Diffusion Equations.
- **November 2013**. Universidad de Santiago de Chile. Nonlinear elliptic boundary value problems at resonance with nonlinear Wentzell-Robin type boundary conditions.
- **November 2012**. GAFEVOL 2012. Universidad de Santiago de Chile. Quasi-linear elliptic and elliptic-parabolic equations with nonlinear general Wentzell boundary conditions and L^1-data.
- **November 2011**. GAFEVOL 2011. Universidad de Santiago de Chile. Dirichlet and Neumann boundary conditions for the p-Laplace operator: What is in between?
- **November 2010 (one mouth). Visiting professor at the University of Metz (France)**.
- **May 2008. The 6th International Conference on PDEs and Dynamical Systems, Maryland**. Title: Generation of cosine families on $L^p(0, 1)$ by elliptic operators with Robin boundary conditions.
- **December 2006. The 5th International Conference on PDE and Dynamical Systems, the University of Texas Pan-American in Edinburg**. Title: The p-Laplacian with nonlinear Wentzell-Robin type boundary conditions.
- **January 2006. University of Metz (France)**. Title: The wave equation with Wentzell-Robin boundary conditions on L^p-spaces.
- **December 2005. University of Ulm (Germany)**. Title: The wave equation with Wentzell-Robin boundary conditions on L^p-spaces.
- **December 2004. University of Eichstätt (Germany)**. Title: Regularity in capacity and the Dirichlet Laplacian.
- **December 2003. PDEs in Rough Environments. Schmitten Frankfurt am Main (Germany)**. Title: The wave equation in L^p-spaces.
- **January 2003. University of Ulm (Germany)**. Title: Removable singularities for a Sobolev space.

- **March 2002. Third European-Maghreb Workshop on Semigroup Theory, Evolution Equations and Applications. Marrakesh (Morocco)**. Title: Relative capacity and characterization of semigroups sandwiched between the Dirichlet and Neumann Laplacian Semigroups.

- **June 2002. University of Ulm (Germany)**. Title: General Robin boundary conditions on arbitrary domains.

- **April 2001. University of Halle (Germany)**. Title: Wentzell-Robin boundary conditions on $C[0.1]$.

- January 2001. **University of Darmstadt (Germany)**. Title: The relative capacity and the Robin Laplacian on $L^2(\Omega)$.

- **November 2000. 7th International Conference on Evolution Equations and Their Applications in Physical and Life Sciences. Trento (Italy)**. Title: The Laplacian with Wentzell-Robin boundary conditions.

- **April 2000. University of Darmstadt (Germany)**. Title: Semigroups between the Dirichlet and Neumann Laplacian Semigroups.

- **February 2000. University of Karlsruhe (Germany)**. Title: The Heat Kernel with Robin boundary conditions.

- **June 1999. Internet Seminar Blaubeuren (Germany)**. Title: The semigroups generated by elliptic operators.

2. **National**

- **March 2019**. George Mason University, Fairfax. Existence and regularity theory for local and nonlocal PDEs and their applications.

- **September 28, 2018**. George Mason University, Fairfax. Analysis of the controllability of space/time fractional evolution equations.

- **June 18-22, 2018**. Brown University, Providence. ICERM. Fractional PDEs: Theory, Algorithms and Applications.

- **March 30, 2018**. George Mason University, Fairfax, Virginia. Elliptic problems associated with the fractional Laplace operator.

- **January 2018**, Florida International University, Miami. Analysis of the null-controllability of space/time fractional diffusion equations.

- **September 2017**, Arlington Virginia, Air Force Office of Scientific Research. Null-controllability of fractional diffusion equations, what is so far known and what is unknown?

- **August 2017**, Iowa State University. Main speaker at the "Nonlocal School on Fractional PDEs". What are the boundary conditions for the fractional Laplace operator?

- **November 2015**, George Mason University. Some Recent Progress on the Controllability of Fractional Super Diffusion Equations.

- **May 2015**, Florida International University. The Dirichlet-to Neumann operator for the fractional Laplacian.

- **March 2015**. AMS sectional Meeting. George Town University. The Pohozaev identity associated with the fractional Laplace operator with fractional Neumann boundary conditions.
- **April 2013**. AMS sectional Meeting. Iowa State University. Semi-linear elliptic and elliptic-parabolic equations with Wentzell boundary conditions and L^1-data.
- **March 2013. University of Texas at San Antonio**. Riesz type representation theorem and characterization of all boundary conditions sandwiched between the Dirichlet and Neumann boundary conditions.
- **April 2012. Iowa State University**. Dirichlet and Neumann boundary conditions for the p-Laplace operator: What is in between?
- **December 2009. Wayne State University**. Title: Existence of solutions to some quasi-linear PDEs with generalized Robin boundary conditions.
- **April 2009. University of Missouri at Columbia**. Title: The heat equation with generalized nonlinear Robin boundary conditions.
- **November 2008. Iowa State University**. Title: The heat equation with nonlinear Robin boundary conditions.
- **April 2006. The University of Memphis. Department of Mathematical Sciences**. Title: Regularity in Capacity and the Dirichlet Problem.
- **April 2006. Differential Equations Weekend. Workshop organized by the Department of Mathematical Sciences of the University of Memphis**. Title: The p-Laplacian with nonlinear Wentzell-Robin type boundary conditions on L^q-spaces.

3. **Regional**

- **February 2007. SIDIM. University of Puerto Rico (UPR) at Ponce**. Title: Regularity in Capacity and the Dirichlet
- **March 2007. UPR Rio Piedras**. Title: Different Domains may have the same Perron and Poisson Solutions.
- **February 2006. SIDIM. Universidad del Turabo**. Title: Dirichlet and Neumann boundary conditions: What is in between?
- **September 2005. UPR Rio Piedras**. Title: The Dirichlet Problem.
- **May 2003. UPR Rio Piedras. Mini Workshop on Evolution Equations**. Title: Dirichlet Problem and Stability.
- **April 2003. UPR Rio Piedras**. Title: Capacities and Sobolev Spaces II.
- **March 2003. UPR Rio Piedras**. Title: Capacities and Sobolev Spaces I.
- **February 2003. SIDIM UPR Ponce**. Title: Removable singularities for a Sobolev space.

Academic Advising for the development of research and teaching:

- Completed PhD projects.

1. (June 2020) Ernest Aragones: **On the approximate controllability of fractional differential equations**.
2. (October 2019) Fabian Seoanes Correa: **Fractional Gaussian Estimates and Holomorphy of Semigroups**.
3. (December 2017) Li Yanyan: **Fine regularity of solutions to the Dirichlet problem associated with the regional fractional Laplace operator**.
4. (July 2015) Rafael Aparicio: **Well-posedness and maximal regularity of solutions of some evolution equations**.
5. (December 2010) Edgardo Alvarez-Pardo: **Perturbing the boundary conditions of a generator of a cosine family**.
6. (May 2010) Alejandro Velez-Santiago: **Parabolic and elliptic equations with nonlocal Robin boundary conditions on non smooth domains**.

- Completed postdoctoral fellows.

  1. (2018-2019) Silvia Rueda (UPRRP).
  2. (2018-2019) Jorge Gonzalez-Camus (UPRRP).
  3. (2017-2018) Burkhard Claus (UPRRP).
  4. (2016-2017) Sébastian Zamorano (UPRRP).
  5. (2015-2016) Umberto Biccari (UPRRP).

- Mentoring.

  1. Mentor of more than 10 undergraduate students through the PR-LSAMP and STEM projects at UPR-RP on the topics: **Calculus, Differential Equations and the Exponential Function**, and **Explicit solutions of the one-dimensional Heat and Wave equations**.
  2. Mentor of 2 graduate student through the STEM project on the topic: **Fine regularity of solutions to elliptic equations with various boundary conditions on bad domains**.

Conferences and Workshops:

- I have co-organized a special session on "Fractional/Nonlocal PDEs: applications, control, and beyond" at the Sixth International Conference on Continuous Optimization (ICCOPT 2019) in Berlin, August 3-8, 2019.

- I have organized a workshop on "Dynamics, Control and Numerics for Fractional PDEs". The workshop was held on December 5-7, 2018 at the Embassy Suites Hotel in San Juan, Puerto Rico. The workshop was funded by the AFOSR and the ARO.

- I have organized a special session on the Dynamics, Control and Numerics for Fractional Partial Differential Equations at the Mathematical Congress of the Americas 2017 (Montreal, Canada on July 24 - 27, 2017).

- I have organized a special session on Partial Differential Equations at the Spring Central Sectional AMS Meeting (Iowa State University, Ames, April 27-28, 2013).

Member of International and National Organizations:

- American Mathematical Society.

- National Alliance for Doctoral Studies in the Mathematical Sciences.