# Debayan Maity

*Curriculum Vitae*

*Departamento de Matemáticas*
*Universidad Autónoma de Madrid, 28049 Madrid, Spain*
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## Current Employment

Apr. 2019 **Post Doctoral Researcher**, *Universidad Autónoma de Madrid*.
Supervisor: Prof. Enrique Zuazua.

## Previous Employment

Apr. 2016 - Mar. 2019 **Post Doctoral Researcher**, *Institut de Mathématiques de Bordeaux*, Bordeaux,France.
Supervisor: Prof. Marius Tucsnak.

Nov. 2015 - Mar. 2016 **Post Doctoral Researcher**, *Tata Institute Of Fundamental Research-CAM*, Bangalore,India.
Supervisor: Prof. Mythily Ramaswamy.

## Education

2012-2015 **PhD**, *Tata Institute Of Fundamental Research-CAM*, Bangalore,India.
Title: *Control and Stabilization of Fluid Models.*
`http://eprints.tifrbng.res.in/645/`
Thesis Advisor: Prof. Mythily Ramaswamy.
Date of Defense: 16 Dec 2015.

2011-2012 **Master Degree Dissertation**, *Tata Institute Of Fundamental Research-CAM*, Bangalore,India.
Title:*Control of a Fluid Model.*
Thesis Advisor: Prof. Mythily Ramaswamy.

2009–2011 **M.Sc in Mathematics**, *Tata Institute Of Fundamental Research-CAM*, Bangalore,India, *1st class*.

2006–2009 **B.Sc in Mathematics**, *University of Calcutta*, Kolkata,India, *1st class*.

## Research Interests

### Partial Differential Equations

- Fluid-Structure Interaction: Modelling and mathematical analysis of FSI problems, Existence, uniqueness and long time behaviour of the solutions, Maximal $L^p$ regularity of solutions
- Control of PDE : Controllability and Stabilizability of fluid models : Compressible Navier-Stokes System, Viscoelastic Fluid Models, Fluid Structure interaction models.
- Population Dynamics: Control and identification problems for systems including models from population dynamics : Lotka-McKendrick model, Lobesia botrana model etc.

## Publications

### Published and accepted articles

[1] Analysis of a simplified model of rigid structure floating in a viscous fluid, with J. San Martín, T. Takahashi, and M. Tucsnak, To appear in *Journal of Nonlinear Science.*

[2] Lack of null controllability of viscoelastic flows, with D. Mitra and M. Renardy, To appear in *ESAIM Control Optim. Calc. Var.*

[3] On the Null Controllability of the Lotka-Mckendrick System, To appear in *Math. Control Relat. Fields.*

[4] Mathematical Analysis of the Motion of a Rigid Body in a Compressible Navier-Stokes-Fourier Fluid, with B. H. Haak, T. Takahashi and M. Tucsnak, *Math. Nachr. 292 (2019), no. 9, 1972-2017*

[5] Controllability and Positivity Constraints in Population Dynamics with Age Structuring and Diffusion, with M. Tucsnak and E. Zuazua, *J. Math. Pures Appl. (9) 129 (2019), 153–179.*

[6] $L^p$-$L^q$ Maximal Regularity for some Operators associated with Linearized Incompressible Fluid-Rigid Body Problems, with M. Tucsnak, *Mathematical analysis in fluid mechanics - selected recent results, vol. 710 of Contemp. Math., Amer. Math. Soc., Providence, RI, 2018, pp. 175 - 201.*

[7] Feedback Stabilization of the Incompressible Navier-Stokes Equations Coupled with a Damped Elastic System in Two Dimensions, with J. -P. Raymond, *J. Math. Fluid Mech. 19 (2017), no. 4, 773-805.*

[8] Analysis of a system modelling the motion of a piston in a viscous gas, with T. Takahashi and M. Tucsnak, *J. Math. Fluid Mech. 19 (2017), no. 3, 551-579.*

[9] Some Controllability Results For Linearized Compressible Navier-Stokes System, *ESAIM Control Optim. Calc. Var. 21 (2015), no. 4, 1002-1028.*

[10] Local Stabilization of Compressible Navier Stokes System, around null velocity, in One Dimension, with S. Chowdhury, M. Ramaswamy and J. - P. Raymond, *J. Differential Equations 259 (2015), no. 1, 371-407 , 2015.*

### Book Chapters

- A Maximal Regularity Approach to the Analysis of Some Particulate Flows, with M. Tucsnak, *Particles in Flows, 1 -75, Adv. Math. Fluid Mech., Birkhäuser/Springer, Cham, 2017.*

### Submitted articles

[1] Local-in-time existence of strong solutions of a 3D fluid structure interaction model, with A. Roy and J. -P. Raymond, Submitted.

[2] Controllability of a Class of Infinite Dimensional Systems with Age Structure, with M. Tucsnak, and E. Zuazua, Submitted.

[3] $L^p$ theory for the interaction between the incompressible Navier-Stokes system and a damped beam, with T. Takahashi, Submitted.

## Teaching Experience

- Fall 2018 : *Optimisation continue*, Master 1, Université De Bordeaux.
- Fall 2014 : *Ordinary Differential Equations*, Master level (Teaching Assistant), TIFR-CAM.
- Fall 2013 : *Complex Analysis*, Master level (Teaching Assistant), TIFR- CAM.
- Spring 2013 : *Functional Analysis*, Master level (Teaching Assistant), TIFR- CAM.

## Long Term Research Visits

Jan. 2016 - Feb. 2016 School of Mathematics, Sichuan University, China.

May 2015 Institut de Mathématiques de Toulouse, Paul Sabatier University,Toulouse, France, (IFCAM project "Control of PDEs").

Mar. 2015 - Apr. 2015 Institut Élie Cartan de Lorraine, Nancy,France, (IFCAM project "Control of PDEs").

Mar. 2014 - May 2014 Institut de Mathématiques de Toulouse, Paul Sabatier University,France, (IFCAM project "Control of PDEs").

## Academic Services

- Reviewer of articles in the following journals: Boundary Value Problems, Communications in Partial Differential Equations, ESAIM : Control, Optimisation and Calculus of Variations, Mathematical Control and Related Fields, Mathematics of Control Signals and Systems, Proceedings - Mathematical Sciences, SIAM Journal of Control and Optimization,
- Reviewer for Mathematical Reviews.

## Invited Talks

- Fluid-Structure models arising in blood-flow models, *8th Workshop on PDE, Optimal Design and Numerics, Centro de Ciencias Pedro Pascual*, Benasque, Spain , 23 August 2019.
- Lack of null controllability of viscoelastic flows, *International conference on elliptic and parabolic problems*, Gaeta, Italy , 21 May 2019.
- Lack of null controllability of viscoelastic flows, *Homogenization, Spectral problems and other topics in PDE's*, ICMAT - Madrid, 6 May 2019.
- Controllability and positivity constraints in population dynamics with age structuring and diffusion. *Séminaire Dynamique des populations,* IMB Bordeaux, January 31,2019.
- Mathematical Analysis of the Motion of a Rigid Body in a Compressible Navier-Stokes-Fourier Fluid.*Réunion* IFSMACS, Nancy, January 22, 2019.
- Mathematical Analysis of a Rigid Body in a Viscous Incompressible Gas.*Department of Mathematics,* IIT Mumbai, April 25,2018
- Mathematical Analysis of the Motion of a Rigid Body in a Compressible Navier-Stokes-Fourier Fluid,*Colloquium Talk, TIFR CAM,* Bangalore, April 10, 2018
- A maximal regularity approach to the analysis of some FSI problems,*INFIDHEM meeting,* Toulouse, April 6, 2018
- Feedback stabilization of a Fluid Structure Model, *VII Partial differential equations, optimal design and numerics*, Benasque, Spain, August 28, 2017.
- Feedback stabilization of a Fluid Structure Model, *Control of Distributed Parameter Systems*, Bordeaux, France, July 4, 2017.
- A maximal regularity approach to the analysis of some Particulate flows, *DMS seminar, IISER Kolkata*, Kolkata, India, March 30, 2017.
- Analysis of a system modelling the motion of a piston in a viscous gas. *Nonlinear Partial Differential Equations and Applications*, Paris, France, June 21, 2016.

## Computer skills

- Markup Language: Latex
- Operating Systems: Unix/Linux, Windows.
- Mathematical Software: Matlab, Mathematica.

## Personal Information

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| Nationality | Indian. |
| Languages | English, Hindi, Bengali. |