



ERCIM "ALAIN BENSOUSSAN"  
FELLOWSHIP PROGRAMME



## Scientific Report

First name / Family name

Félix / del Teso

Nationality

Spanish

Name of the *Host Organisation*

Norwegian University of Science and  
Technology (NTNU)

First Name / family name  
of the *Scientific Coordinator*  
Period of the fellowship

Espen R. / Jakobsen

01/01/2017 to 31/12/2018

## I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

Together with Espen R. Jakobsen and Jørgen Endal, we have been mainly working in theoretical and numerical aspects for nonlocal equations of porous medium type. Some of the topics are: well-posedness, behaviour of solutions, convergent numerical schemes, robustness of the schemes and compactness arguments for schemes.

As a result of my research I have received the prize “Vicent Caselles” for researchers under 30 given by the Spanish Mathematical Royal Society

## II – PUBLICATION(S) DURING YOUR FELLOWSHIP

### Published:

[1] F. del Teso, J. Endal, and E. R. Jakobsen. Uniqueness and properties of distributional solutions of nonlocal equations of porous medium type. *Adv. Math.*, 305:78–143, 2017.

[2] F. del Teso, J. Endal, and E. R. Jakobsen. On distributional solutions of local and nonlocal problems of porous medium type. C. R. Math. Acad. Sci. Paris, 355(11):1154–1160, 2017.

**Accepted:**

[3] F. del Teso, J. Endal, and E. R. Jakobsen. On the well-posedness of solutions with finite energy for nonlocal equations of porous medium type. To appear in EMS Series of Congress Reports, 2017.

[4] N. Cusimano, F. del Teso, L. Gerardo-Giorda, and G. Pagnini. Discretizations of the spectral fractional Laplacian on general domains with Dirichlet, Neumann, and Robin boundary conditions. Accepted for publication in SIAM Journal of Numerical Analysis.

**Pending (submitted for publication):**

[5] D.Stan, F. del Teso and J.L Vázquez. Porous Medium Equation with nonlocal pressure. [arXiv:1801.04244](https://arxiv.org/abs/1801.04244)

[6] F. del Teso, J. Endal, and E. R. Jakobsen. Robust numerical methods for local and nonlocal equations of porous médium type. [arXiv:1801.07148](https://arxiv.org/abs/1801.07148)

### III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

- 1 Invited talk at the session in "Nonlinear PDEs" during the Catalan, Spanish, Swedish Math Meeting, 13-15 June 2017. Umeå (Sweden).
- 2 Invited talk at mini-symposium "Numerical Methods for Nonlocal Problems" at the 27th Biennial Numerical Analysis Conference, 27-30 June 2017. Glasgow (UK).
- 3 Invited talk at conference of Young Researchers, 4-8 September 2017, Universidad de Valencia. Valencia (Spain)

### IV – RESEARCH EXCHANGE PROGRAMME (REP)

Not done yet.