Nicolas Van Goethem

CMAFcIO
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Belgian

Born: 12 March 1976 in Sorengo (CH)

Married, 2 children

1 Scholarly indicators

Database coordinates

Researcher ID (WoS): A-7674-2013

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(van goethem, n*)

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H-index

ISI (WoS)=10

Scopus=10

Google scholar=14

Researchgate=14

Citations

Google scholar=653

Researchgate=530

ISI (WoS)=324

Scopus=340

2 Research interests

Mathematical modelling in material science: theory, numerics & applications.

Physical and mathematical science of solids:
Continuum mechanics & thermodynamics of defects in solids (damage, fracture & dislocations);
Finite elasticity & linearized elasto-plasticity;
Axiomatic approach to thermodynamics.

Variational methods in material science:
Γ-convergence;
Shape and topological optimization methods: theory and numerics.

Partial differential equations (elliptic & parabolic) and functional analysis;

Geometric measure theory (theory of currents for dislocation modelling);

Differential geometry (non-Riemannian geometry of crystals with defects).

3 Curriculum data

3.1 Education

Doctorat en Sciences Appliquées, Ecole Polytechnique de Louvain, Université catholique de Louvain (UCL), Louvain-la-Neuve, Belgium

Graduate studies in Applied Mathematics: Université catholique de Louvain (UCL), Ecole Polytechnique de Louvain, Louvain-la-Neuve, Belgium

Undergraduate studies: European School of Varese (Italy) and Brussels (Belgium).

3.2 Qualifying Examinations

14/11/2014: Italian Associate Professor Qualification in Mathematical Analysis, Probability and Statistics ("abilitazione alle funzioni di professore di seconda fascia in analisi matematica, probabilita e statistica matematica" (qualified with unanimity.)

2007: French qualification for "Maître de Conférence" position in Applied Mathematics (section 26).

3.3 Employment history

Currently: Professor auxiliar at FCUL

In charge since 01.04.2008 at FCUL

July 2020-December 2020: Principal researcher at CMAcIO research center:

CEEC2018 contract.

September 2019-June 2020: Invited researcher at CMAFcIO (-February 2020) and FCiências.id (February 2020-).

July 2014 - June 2019: Faculty researcher at the Faculty of Science (Mathematics Department) of the University of Lisbon, Portugal:

iFCT2013 contract.

Dec. 2012-June 2014: Contract researcher at the Functional Analysis Sector, SISSA, Trieste, Italy

ERC project: "Quasistatic and Dynamic Evolution Problems in Plasticity and Fracture" (PI: G. Dal Maso)

April 2008-November 2012: Ciência faculty researcher at CMAF, Lisbon, Portugal

Ciência 2007 contract

Jan. 2007- Feb. 2008: Post-doctoral training at the Ecole Polytechnique, Palaiseau, France

ER-Marie Curie post-doctoral fellow

Work with G. Allaire on Optimization problems (MULTIMAT Research Training Network)

Sept. 2000 - Dec. 2006: Doctoral research and teaching assistant at UCL, Belgium

PhD fellowship & contract of research assistant. Superviser: F. Dupret

Sept. 2003 - Dec. 2003:

ESR-Marie-Curie fellowship at University College of London, UK

Work with D. Preiss on Real analysis problems

Sept. 1999 - Aug. 2000: Internship at the University of Pisa, Italy,

Grant from Belgian CGRI

Work with G. Buttazzo on Shape opimization problems

3.4 Competitions, Prizes & Grants

2019: Selected for FCT CEEC2018 (sole principal researcher in Mathematics for this call).

2014: Selected for FCT exploratory research project (MATH2DISLOC–50K euros grant).

2013: Selected for Investigador FCT 2013 call.

2012: Selected for ERC research contract call at SISSA, Trieste (IT).

2008: Selected for FCT Ciência 2007 call.

2006: Selected for Marie Curie ER fellowship call.

2003: Selected for Marie Curie ESR fellowship call.

4 Scientific projects and funding

4.1 Projects and external funding

- As PI:

  MATH2DISLOC FCT research project (2014-2019): "Mathematical theory of dislocations: geometry, analysis, and modelling".

4.2 Group coordination

2017-2019: "Mathematical modelling in material science: fracture, dislocations and elastoplasticity".

Description: This research unit within CMAFcIO carries out research in the mathematical modelling and/or analysis of phenomena arising in material science, in particular about solids with defects and singularities such as cracks and dislocations. Variational as well as non-variational techniques are used and developped. Theoretical as well as numerical results are sought. New models, new methods and new algorithms are proposed.

Members:

Riccardo Scala (CFAMcIO post-doc, 2017-2018) works on "Dislocation lines in single crystals: mathematical formalism and modelling".

Marco Caroccia (post-doc, 2017-2018) works on "Damage-to fracture models: theory and applications".

Pedro Campos (Gulbenkian novos talentos, 2017-): works on "A fundamental approach to Entropy principles".

4.3 Conference & symposium organization

- Chair of a 8ECM minisymposium: "Nonlinear analysis for continuum mechanics", Portoroz, Slovenia, June 24-25, 2021
- Keynote lecture & minisymposium at Conference *Dynamics, Equations and Applications*, AGH University of Science and Technology (Kraków, Poland), September 16-20, 2019 (https://www.dea.agh.edu.pl/).
- Topics in nonlinear analysis: Calculus of variations and PDEs-*Autumn 2018 Workshop in Lisbon.* Lisbon, October 10-12, 2018 (https://sites.google.com/view/cvpdelisboa/home).
- First CIM-WIAS workshop: *Topics in Applied Analysis and Optimisation (Stochastic, Partial Differential Equations and Numerical Analysis).* Lisbon, December 6-8, 2017 (http://cmafcio.ciencias.ulisboa.pt/taao2017).

5 Recent written scientific production

5.1 Publications in international peer-reviewed journals (37)

3. S. Amstutz and **N. Van Goethem**, Existence and asymptotic results for an intrinsic model of incompatible small-strain elasticity, Discrete and Continuous Dynamical Systems B, 25 (10), 3769-3805. *(ISI IF=1.3; Scimago Q2).*

4. M. Caroccia, M. Focardi, **N. Van Goethem**, On integral representation of local energy functionals on BD, SIAM J. Math. Anal., 52(4), 4022-4067.
(ISI IF=1.3; Scimago Q1; Scopus percentile: 85–Analysis).

5. R. Scala, **N. Van Goethem**, Analytic and geometric properties of dislocation singularities, Proc. R. Soc. Edinburgh: Section A Math., 150(4), 1609-1651.
(ISI IF=1.0; Scimago Q1; Scopus percentile: 78–General mathematics).

6. M. Xavier, **N. Van Goethem**, A. Novotny, Hydro-mechanical fracture modelling governed by topological derivatives, Computer Methods in Applied Mechanics and Engineering, 365 (15), 112974

2019

7. M. Caroccia and **N. Van Goethem**, Damage-driven fracture with low-order potentials: asymptotic behavior and applications, ESAIM:M2AN, 53 (4), 1305-1350, 2019.
(ISI IF=2.0, Scimago Q1; Scopus percentile: 89–Analysis).

8. R. Scala, **N. Van Goethem**, A variational approach to single crystals with dislocations, SIAM J. Math. Anal., 51 (1), 489–531, 2019 (ISI IF=1.65, Scimago & WoS Q1).

9. R. Scala, **N. Van Goethem**, Variational evolution of dislocations in single crystals, J. Nonlinear Sci., 29(1),319–344, 2019. (ISI IF=1.90, Scimago & WoS Q1).

2018

10. M. Xavier, **N. Van Goethem**, A. Novotny, A simplified model of fracking based on the topological derivative concept., Int. J. Sol. Struct., 139-140, 211–223, 2018. (ISI IF=2.58, Scimago & WoS Q1).

5.2 International conference proceedings (2)

11. S. Amstutz and **N. Van Goethem**, The incompatibility operator: from Riemann's intrinsic view of geometry to a new model of elasto-plasticity, in TOPICS IN APPLIED ANALYSIS AND OPTIMIZATION, CIM Series in Mathematical Sci., J. F. Rodrigues and M. Hintermüller eds., 2019. (Hal preprint: hal- 01789190).

12. G. Allaire, F. Jouve, **N. Van Goethem**, A level set method for the numerical simulation of damage evolution, in PROCEEDINGS OF ICIAM 2007 ZÜRICH, R. Jeltsch and G. Wanner eds., EMS, Zürich, 2009

6 Pedagogical activity and training

6.1 Lecturing and teaching

Mathematics Department, University of Lisbon (in Portuguese)

- Lecturing

  Differential geometry (Bachelor year 3, 2021-, 5h weekly, Portuguese)

  Mathematical methods in Physics (Master, 2016-2018&2020-2021, 6h weekly, Portuguese and English.)

  Rational mechanics (Undergraduate, 2015-, 5h weekly, Portuguese.)

- Teaching

  Computational methods in Geology (Undergraduate, 2009-2012, 3h weekly, Portuguese.)

7 Miscellaneous

Musical composition and organization of musical composition workshops. Tennis & hiking.