



Roger Nakad, Doctorate

Associate Professor
 Interim Dean
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Biography

Roger Nakad was awarded a Master's degree in pure mathematics from the Lebanese University and the University of Paul Verlaine, Metz, France. In 2011, he earned his doctorate in mathematical sciences from the University of Henri Poincaré, Nancy, France, and then he held a postdoctoral position at the Max Planck Institute for Mathematics in Bonn, Germany. His mathematical interests lie in the field of Differential Geometry and mainly in Spinorial Geometry. He joined the Department of Mathematics and Statistics, FNAS, at Notre Dame University-Louaizé in fall 2012. He has been invited to lecture in France, Germany, Poland, Romania, Greece, Mexico, Luxembourg, Portugal, Italy, and United Arab Emirates among other places. He was also invited to the University of Mexico, the University of Leipzig in Germany; the University of Regensburg in Germany; the CIRM in France, the CIRM in Italy and the University of Paris-Est in France, to work jointly on many research projects. In 2013-2014, he received the "Berlin Einstein Fellowship" for 6 months: he joined the differential geometry group of Professor Christian Baer (University of Potsdam, Germany) in summer 2013 and summer 2014. Dr. Nakad served as the Department of Mathematics and Statistics chairperson at NDU from 2019 to 2023. As of Fall 2023, he is the Interim Dean of the Faculty of Natural and Applied Sciences.

International

- Lower bounds for the eigenvalues of the Dirac operator on Spin^c manifolds, *J. Geom. Phys.* 60 (2010), 1634-1642.
- The energy-momentum tensor on Spin^c manifolds, *IJGMMP* Vol. 8, No. 2, 2011.
- The Hijazi inequalities on complete Riemannian Spin^c manifolds, *Advances in Mathematical Physics*, vol. 2011, Article ID 471810, doi:10.1155/2011/471810.
- The energy-momentum tensor on low dimensional Spin^c manifolds, with Georges Habib, *International Journal of Mathematics* Vol. 23, No. 9, 2012.
- Hypersurfaces of Spin^c manifolds and Lawson correspondence, with Julien Roth, *Ann. Glob. Anal. Geom.*, Vol. 42, No. 3 (2012), 421-442.
- The Spin^c Dirac operator on hypersurfaces and applications, with Julien Roth, *Differential Geometry and its Applications*, 31 (2013), 93-103.
- The twisted Spin^c Dirac operator on Kähler submanifolds of the complex projective space, with Georges Habib, *Journal of Geometry and Physics*, 77 (2014), 43-47.
- Boundary value problems for noncompact boundaries of Spin^c manifolds and spectral estimates, with Nadine Grosse, *Proc. London Math. Soc.* (3) 109 (2014) 946-974.
- Complex Generalized Killing Spinors on Riemannian Spin^c manifolds, with Nadine Grosse, *Results in Mathematics*, Vol. 67, Issue 1 (2015), 177-195.
- Riemannian foliations with parallel or harmonic basic forms, with Fida El Chami, Nicolas Ginoux and Georges Habib, *Archivum Mathematicum (BRNO)* 2015, Tomus 51, pp. 51-65.

- Lower bounds for the eigenvalues of the Spin^c Dirac operator on submanifolds, with Julien Roth, Archiv der Mathematik, Volume 104 (2015), Issue 5, pp 451-461.
- Eigenvalue estimates of the Spin^c Dirac operator and harmonic forms on Kähler-Einstein manifolds, with Mihaela Pilca, SIGMA 11(2015), 054, 15 pages.
- Lower bounds for the eigenvalues of the Spin^c Dirac operator on manifolds with boundary, with Julien Roth, Comptes-rendus-Mathématique Vol 354 no 4 (2016), pp 425-431.
- Rigidity results for Spin^c manifolds with foliated boundary, F. El-Chami, N. Ginoux, G. Habib and R. Nakad, J. Geom. 107 (2016), 533-555.
- Complex and Lagrangian surfaces in the complex projective space via Kählerian Killing Spinor spinors, R. Nakad and J. Roth, J. Geom. Phys. 116 (2017), 316-329.
- Rigidity results for Riemannian Spin^c manifolds with foliated boundary, F. El-Chami, N. Ginoux, G. Habib and R. Nakad, Results in Math. (72), 1773-1806, 2017.
- Eigenvalue Estimate for the basic Laplacian on manifolds with foliated boundary, F. El Chami, G. Habib, O. Makhoul and R. Nakad, Ricerche Mat. (2017). <https://doi.org/10.1007/s11587-017-0339-7>.
- Spinorially twisted spin structures, III: CR structures, R. Herrera, R. Nakad and Ivan Tellez, J. Geom. Anal. (2017), <https://doi.org/10.1007/s12220-017-9958-1>.
- Eigenvalue Estimate for the basic Laplacian on manifolds with foliated boundary, Part II , F. El Chami, G. Habib, O. Makhoul and R. Nakad, Mediterr. J. Math. (2018) 15: 67. <https://doi.org/10.1007/s00009-018-1111-2>.
- Hybrid functions approach to solve a class of Fredholm and Volterra integro-differential equations, A. Hosry, R. Nakad and S. Bhalekar, Math. Comput. Appl. 2020, 25 (2), 30.
- Totally umbilical hypersurfaces of Spin^c manifolds carrying special spinor fields, N.Grosse and R. Nakad, International Journal of Mathematics, Volume No. 31, No. 12, Article No.2050100, Year 2020.
- Characterization of hypersurfaces in four dimensional product spaces via two different Spin^c structures, R. Nakad and J. Roth, Annals of Global Analysis and Geometry, Vol 61, no 1 (2022), pp 89-114.

Chapters in Books

International

- Special Submanifolds of Spin^c manifolds, University of Henri Poincaré, Nancy 1, France. (Doctorate thesis).

Exhibitions, Competitions and Creative Work

International

- Dr. Roger Nakad got the "Berlin Einstein Fellowship" in 2013 and 2014.
- Dr. Roger Nakad is a member of the project "Geometric boundary value problems of the Dirac operator" funded by the Federal state of Baden-Wurttemberg from October 2016 to September 2019.

Esteemed indicators

- Reviewer for several reputable international journals.
- Member of the organizing committee of the international conference on Differential Geometry organized by The Center for Advanced Mathematical Sciences CAMS-AUB and Lebanese University, 21-23 March 2013. The Center for Advanced Mathematical Sciences CAMS-AUB and Lebanese University, 9 and 10 May 2014. The Center for Advanced Mathematical Sciences CAMS-AUB and Notre Dame University-Louaizé-NDU, 27–30 April 2015.
- Member of the organizing committee of the 21th International Science Conference organized by the Lebanese Association for the Advancement of Sciences (LAAS21).
- Member of the organizing committee of the conference organized by the Lebanese Society for the Mathematical Sciences (LSMS 2016, LSMS 2017, LSMS 2018, LSMS 2019, LSMS 2022).

Research Visits

- Dec. 13 to Dec. 18, 2010: Laboratoire d'Analyse et de Mathematiques Appliquees de l'Universite Paris-Est, Marne-la-Vallee, France.
- Jun. 13 to Jun. 18, 2011: Laboratoire d'Analyse et de Mathematiques Appliquees de l'Universite Paris-Est, Marne-la-Vallee, France.

- Apr. 23 to Apr. 27, 2012: The Institute of Mathematics, University of Leipzig, Germany.
- Apr. 29 to May 15, 2012: Centro de Investigacion en Matematicas, A.C. (CIMAT), Guanajuato, Mexico.
- May 20 to May 23, 2012: The Institute of Mathematics, University of Regensburg, Germany.
- May 29 to Jun. 3, 2012: The Institute of Mathematics, University of Marburg, Germany.
- Jul. 22 to Jul. 27, 2012: The Institute of Mathematics, University of Humboldt, Berlin.
- Feb. 2 to Feb. 18, 2013: The Institute of Mathematics, University of Leipzig, Germany.
- Jul. 1 to Aug. 31, 2013: The Institute of Mathematics, University of Postdam, Germany.
- Sept. 1 to Sept. 25, 2013: Laboratoire d'Analyse et de Mathematiques Appliquees de l'Universite Paris-Est, Marne-la-Vallee, France.
- Feb. 10 to Feb. 20, 2014: Centre International de Rencontres Mathematiques, Luminy, Marseille-France, Research in pairs with JProf. Nadine Grosse.
- Jul. 1 to Sept. 19, 2014: The Institute of Mathematics, University of Postdam, Germany.
- Jul. 20 to Jul. 26, 2014: The Institute of Mathematics, University of Regensburg, Germany.
- Aug. 25 to Aug. 30, 2014: The Institute of Mathematics, University of Regensburg, Germany.
- Feb. 1 to Feb. 13, 2014: Institut Elie Cartan de Lorraine, Nancy, France.
- Aug. 30 to Sept. 6, 2015: Laboratoire d'Analyse et de Mathematiques Appliquees de l'Universite Paris-Est, Marne-la-Vallee, France.
- Jan. 24 to Feb. 6, 2016: CIRM (Centro Internazionale per la Ricerca Matematica), Trento, Italy, Research in pairs with Prof. Nadine Grosse.
- Jan. 11 to Jan. 24, 2017: The Institute of Mathematics, University of Freiburg, Germany.
- Jun. 15 to Jul. 15, 2017: University of Paris-Est, Marne La Vallee, France.
- Jul. 8 to Jul. 15, 2018: The Institute of Mathematics, University of Freiburg, Germany.
- Jul. 14 to Jul. 19, 2019: The Institute of Mathematics, University of Freiburg, Germany.