CURRICULUM VITAE

Date: January 2026

1.- Personal Data

- Name : Conca Carlos
- Born on : November 4, 1954 in Santiago (Chile)
- Citizenship : Citizen of Chile
- Permanent address : Department of Mathematical Engineering and
  Center for Mathematical Modelling, Umi 2807 Cnrs-UChile
  University of Chile
- Electronic-mail : cconca@dim.uchile.cl, carlos.conca@gmail.com, cconca@uchile.cl

2.- Research and Teaching Positions

- 1973–1979 : Assistant Professor, University of Chile
- 1983–1984 :"Attaché de Recherche" of the French National Scientific Research Center (Cnrs)
- 1984–1986 : Associate Professor, University of Chile
- 1986–1987 :"Chargé de Recherche 1^{ere} Classe" of the French Cnrs
- 1987–1989 : Associate Professor, University of Chile
- 1990–present : Full Professor, University of Chile
- 1997–2010 : Principal Researcher, Fund for Advanced Research in Priority Areas (Fondap)
  of the National Commission for Scientific Research and Technology (Conicyt)
- 2000–present : co-Founder Associate Researcher, Center for Mathematical Modelling (Cmm, UChile)
- 2006–2012 : co-Founder Key Researcher, Institute for Cell Dynamics & BioTechnology (Icdb, UChile)
- 2014–2025 : co-Founder Key Researcher, Center for BioTechnology & BioEngineering (CeBiB, UChile)

3.- Educational Records

- 1971 (December) : End of the high school
- 1977 (February) : Diploma of Mathematical Engineering at the University of Chile
- 1980 (July) : "Diplôme d'Etudes Approfondies", University Pierre and Marie Curie, Paris VI
- 1982 (February) : "Docteur Ingénieur", University Pierre and Marie Curie
- 1987 (July) : "Docteur d'Etat es Sciences Mathématiques", University Pierre and Marie Curie

4.- Awards, Prizes and Honors

- 1994 "Manuel Noriega Morales" prize in Exact Sciences; delivered by the Organization of American States, O.A.S., for his contributions to the Mathematical Analysis of different Partial Differential Equations from Mathematical-Physics.
- 1995 Excellence in Teaching Award. Given by the University of Chile's School of Engineering and Sciences (Escuela de Ingeniería y Ciencias de la Universidad de Chile). Award based on undergraduate Engineering student survey opinions.
- 1996 "Manuel Montt" Award, in the field of Exact Sciences. A National Award, given by "Fundación Pedro Montt" to the best scientific research work published in Chile, or abroad in the last five years. (Award shared with Oscar González-Ferrán).
- Presidential Chair in Mathematical Sciences, 1996, in the field of Partial Differential Equations. Awarded by an International Panel made up of the following distinguished professors: R. Marcus (Pasadena; Panel President, 1990 Nobel Laureate in Chemistry), D. Gross (Princeton), C. Milstein (Cambridge, U.K.), E. Neher (Göttingen) and P. Cartier (Paris).
- "Medalla Rectoral", University of Chile (1996), "Medalla Profesor Titular", University of Chile (2002).
- "Doctor Honoris Causa" of the University of Metz, France (1998).
- "Corresponding Member" of the Chilean Academy of Sciences (since 2002).
- "National Award of Exact Sciences" (2003).
- "Distinguish Former Student, Saint Gabriel's English School" (2004).

- "Excellence Teaching Award, University of Chile" (2006).
- "Full Member" of the Chilean Academy of Sciences (since 2012).
- 2016 "Ramón Salas Edwards" Award, in the field of Technology & Innovation. A National Award given by the "Instituto de Ingenieros de Chile", to the best technological innovation introduced in the Chilean market or abroad in the last three years. (Award shared with Manuel Duarte, John MacKinnon, Nicolás Beltrán (QEPD), Rodrigo Maureira & Vader Johnson).
- Scientific Knowledge Generation 2022 Award at the University of Chile. Award based on data from the Science Citation Index of the Institute for Scientific Information (ISI).

5.- List of Publications

A.- **Books** (Research Monographs)

– Conca C., Planchard J., Thomas B. & Vanninathan M., *Problèmes Mathématiques en Couplage Fluide-Structure. Applications aux Faisceaux Tubulaires*, Eyrolles, Paris (1994). (376 pgs.)

– Conca C., Planchard J. & Vanninathan M., *Fluids and Periodic Structures*, Rma **38**, J. Wiley & Sons/Masson, Paris · New York (1995). (333 pgs.)

B.- **Articles**

(a) **Refereed Journal Publications** (on *Applied Mathematics, Mathematics, Engineering, Mechanics, Mathematical-Physics, Fluids, Acoustics*)

[1] Homogénéisation des équations de Stokes et de Navier-Stokes dans des domaines perforés périodiquement avec des conditions aux limites de type Fourier, *C. R. Acad. Sci. Paris Sér. I Math.* **t.297**, pp. 249–252 (1983).

[2] Approximation de quelques problèmes de type Stokes par une méthode d'éléments finis mixtes, *Numer. Math.* **45**, pp. 75–91 (1984).

[3] On the application of the homogenization theory to a class of problems arising in fluid mechanics, *J. Math. Pures et Appl.* **64**, pp. 31–75 (1985).

[4] Numerical results on the homogenization of Stokes and Navier-Stokes equations modelling a class of problems from fluid mechanics, *Comput. Methods Appl. Mech. Engrg.* **53**, pp. 223–258 (1985).

[5] Introducción a la teoría de la homogeneización, *Epsilon* **6/7**, pp. 9–15 (1986).

[6] A nouveau sur les équations de Stokes et de Navier-Stokes avec des conditions aux limites sur la pression, *C. R. Acad. Sci. Paris Sér. I Math.* **t.304**, pp. 23–28 (1987) (with C. Bègue, F. Murat & O. Pironneau).

[7] Etude d'un fluide traversant une paroi perforée. (I) Comportement limite près de la paroi, *J. Math. Pures et Appl.* **66**, pp. 1–43 (1987).

[8] Etude d'un fluide traversant une paroi perforée. (II) Comportement limite loin de la paroi, *J. Math. Pures et Appl.* **66**, pp. 45–70 (1987).

[9] Eigenfrequencies of a tube bundle immersed in a fluid, *Appl. Math. Optim.* **18**, pp. 1–38 (1988) (with F. Aguirre).

[10] The Stokes sieve problem, *Comm. Appl. Numer. Methods* **4**, pp. 113–121 (1988).

[11] A spectral problem arising in fluid-solid structures, *Comput. Methods Appl. Mech. Engrg.* **69**, pp. 215–242 (1988) (with M. Vanninathan).

[12] Non-homogeneous Neumann problems in domains with small holes, *Rairo Modél. Math. Anal. Numér.* **22**, pp. 561–607 (1988) (with P. Donato).

[13] Sur les bornes du spectre de résonance des grandes faisceaux tubulaires immergés dans un fluide, *Edf Bull. Direction Etudes Rech. Sér. C Math. Inform.* **3**, pp. 1–20 (1989) (with J. Planchard & M. Vanninathan).

[14] Stokes equations with non-smooth data, *Rev. Mat. Apl.* **10**, pp. 115–122 (1989).

[15] Eigenfrequencies for fluid-structure systems, *Comput. Methods Appl. Mech. Engrg.* **75**, pp. 27–37 (1989) (with J. Planchard & M. Vanninathan).

[16] Existence and location of eigenvalues for fluid-solid structures, *Comput. Methods Appl. Mech. Engrg.* **77**, pp. 253–291 (1989) (with J. Planchard & M. Vanninathan).

[17] Resultados numéricos en el problema de la rejilla de Stokes, *Rev. Internac. Métod. Numér. Cálc. Diseñ. Ingr.* **5**, pp. 435–452 (1989) (with M. Sepúlveda).

[18] Limits of the resonance spectrum of tube arrays immersed in a fluid, *J. Fluids Structures* **4**, pp. 541–558 (1990) (with J. Planchard & M. Vanninathan).

[19] Resultados numéricos en un modelo de lavado de una resina macroporosa, *Rev. Internac. Métod. Numér. Cálc. Diseñ. Ingr.* **7**, pp. 139–161 (1991) (with M. Durán & M. Levet).

[20] Ondes de Bloch et vibrations de faisceaux de tubes immergés, *EDF Bull. Direction Etudes Rech. Sér. C Math. Inform.* **2**, pp. 119–138 (1991) (with M. Durán & J. Planchard).

[21] A quadratic eigenvalue problem involving Stokes equations, *Comput. Methods Appl. Mech. Engrg.* **100**, pp. 295–313 (1992) (with M. Durán & J. Planchard).

[22] A bound for the number of nonreal solutions of a quadratic eigenvalue problem, *Adv. Math. Sci. Appl.* **1**, pp. 229–249 (1992) (with M. Durán & J. Planchard).

[23] Resonances frequencies of a cavity containing a compressible viscous fluid, *Math. Methods Appl. Sci.* **15**, pp. 185–202 (1993) (with J. Planchard & M. Vanninathan).

[24] Limiting behaviour of a spectral problem in fluid-solid structures, *Asymptotic Anal.* **6**(4), pp. 365–389 (1993) (with J. Planchard & M. Vanninathan).

[25] On Hermitian quadratic eigenvalue problems of restricted rank, *Appl. Math. Lett.* **6**(6), pp. 9–13 (1993) (with H. Puschmann).

[26] Relaxation totale d'un problème d'optimisation de plaques, *C. R. Acad. Sci. Paris Sér. I Math.* **t.317**, pp. 931–936 (1993) (with E. Bonnetier).

[27] The Bloch wave method and vibrations of elastic cylinder arrays in a fluid, *J. Sound Vibration* **170**(4), pp. 473–493 (1994) (with M. Durán & J. Planchard).

[28] Asymptotic analysis of a multidimensional vibrating structure, *SIAM J. Math. Anal.* **25**(3), pp. 836–858 (1994) (with E. Zuazua).

[29] Existence results for a non-linear problem modeling the displacement of a solid in a transverse flow, *RAIRO Modél. Math. Anal. Numer.* **28**(5) pp. 539–556 (1994) (with P. Donato).

[30] Approximation of Young measures by functions and application to a problem of optimal design for plates with variable thickness, *Proc. Roy. Soc. Edinburgh Sect. A* **124**(3), pp. 399–422 (1994) (with E. Bonnetier).

[31] The Stokes and Navier-Stokes equations with boundary conditions involving the pressure, *Japan. J. Math.* **20**(2), pp. 279–318 (1994) (with F. Murat & O. Pironneau).

[32] A numerical study of a spectral problem in solid-fluid type structures, *Numer. Methods Partial Differential Equations* **11**, pp. 423–444 (1995) (with M. Durán).

[33] Navier-Stokes equations with imposed pressure and velocity fluxes, *Internat. J. Numer. Methods Fluids* **20**(4), pp. 267–287 (1995) (with C. Parès, O. Pironneau & M. Thiriet).

[34] Analyse asymptotique spectrale de l'équation des ondes. Homogénéisation par ondes de Bloch, *C. R. Acad. Sci. Paris Sér. I Math.* **t.321**, pp. 293–298 (1995) (with G. Allaire).

[35] Analyse asymptotique spectrale de l'équation des ondes. Complétude du spectre de Bloch, *C. R. Acad. Sci. Paris Sér. I Math.* **t.321**, pp. 557–562 (1995) (with G. Allaire).

[36] Bloch wave homogenization for a spectral problem in fluid-solid structures, *Arch. Rational. Mech. Anal.* **135**(3), pp. 197–257 (1996) (with G. Allaire).

[37] Added mass and damping in fluid-solid interactions, *Comput. Methods Appl. Mech. Engrg.* **146**(3-4), pp. 387–405 (1997) (with A. Osses & J. Planchard).

[38] Homogenization of periodic structures via Bloch decomposition, *SIAM J. Appl. Math.* **57**(6), pp. 1639–1659 (1997) (with M. Vanninathan).

[39] Rate of convergence estimates for the spectral approximation of a generalized eigenvalue problem, *Numer. Math.* **79**(3), pp. 349–369 (1998) (with M. Durán & J. Rappaz).

[40] Boundary layers in the homogenization of a spectral problem in fluid-solid structures, *Siam J. Math. Anal.* **29**(2), pp. 343–379 (1998) (with G. Allaire).

[41] Asymptotic analysis relating spectral models in fluid-solid vibrations, *Siam J. Numer. Anal.* **35**(3), pp. 1020–1048 (1998) (with A. Osses & J. Planchard).

[42] Bloch wave homogenization and spectral asymptotic analysis, *J. Math. Pures et Appl.* **77**, pp. 153–208 (1998) (with G. Allaire).

[43] Homogenization and Bloch wave method for fluid tube bundle interaction, *Comput. Methods Appl. Mech. Engrg.* **164**, pp. 333–361 (1998) (with G. Allaire & J. Planchard).

[44] Optimality conditions for a relaxed shape optimization problem, *C. R. Acad. Sci. Paris Sér. I Math.* **t.327**, pp. 1005–1010 (1998) (with E. Bonnetier).

[45] Limiting behaviour of tube displacements in a Stokes flow, *Ricerche Mat.* **48**(2), pp. 183–200 (1999) (with J. Saint Jean Paulin).

[46] Fourier homogenization method and the propagation of acoustic waves through a periodic vortex array, *Siam J. Appl. Math.* **59**(5), pp. 1573–1581 (1999) (with F. Lund).

[47] Spectral asymptotics of the Helmholtz model in fluid-solid structures, *Internat. J. Numer. Methods Engrg.* **46**(9), pp. 1463–1504 (1999) (with G. Allaire & M. Vanninathan).

[48] Motion of a rigid body in a viscous fluid, *C. R. Acad. Sci. Paris Sér. I. Math.* **t.328**, pp. 473–478 (1999) (with J. San Martín & M. Tucsnak).

[49] Homogenization of a transmission problem in solid mechanics, *J. Math. Anal. Appl.* **233**(2), pp. 659–680 (1999) (with L. Baffico).

[50] Bloch wave decomposition in the homogenization of periodically perforated media, *Indiana Univ. Math. J.* **48**(4), pp. 1447-1470 (1999) (with D. Gómez, M. Lobo-Hidalgo, M.-E. Pérez).

[51] Homogenization and Bloch wave method for fluid tube bundle interaction, *Comput. Methods Appl. Mech. Engrg.* **180**(1&2), p. 239 (1999) (with G. Allaire & J. Planchard).

[52] Existence results and asymptotic behaviour of stationary displacements of tubes in a Navier-Stokes flow, *Rev. Roumaine Math. Pures Appl.* **45**(1), pp. 21–47 (2000) (with L. Baffico & J. Saint Jean Paulin).

[53] The initial value problem for the Boussinesq equations in a time dependent domain, *Rev. R. Acad. Cienc. Exact. Fis. Nat. (Esp) Matemáticas* **94**(1), pp. 39–48 (2000) (with M. Rojas-Medar).

[54] Existence of solutions for the equations modelling the motion of a rigid body in a viscous fluid, *Comm. Partial Differential Equations* **25**(5&6), pp. 1019–1042 (2000) (with J. San Martín & M. Tucsnak).

[55] On uniform H^2-estimates in periodic homogenization, *Proc. Roy. Soc. Edinburgh Sect. A* **131**(3), doi.org/10.1017/S0308210500000986, pp. 499–517 (2001) (with M. Vanninathan).

[56] A mixing procedure of two viscous fluids using some homogenization tools, *Comput. Methods Appl. Mech. Engrg.* **190**(32-33), 10.1016/S0045-7825(00)00316-9,. pp. 4245–4257 (2001) (with L. Baffico).

[57] A semilinear control problem involving homogenization, *Electron. J. Diff. Eqns. Conf.* **6**, pp. 109–122 (2001) (with A. Osses & J. Saint Jean Paulin) (http://ejde.math.swt.edu).

[58] Bloch approximation in homogenization and applications, *Siam J. Math. Anal.* **33**(5), 10.1137/S003614-1001382200, pp. 1166–1198 (2002) (with R. Orive & M. Vanninathan).

[59] The equations of non-homogeneous asymmetric fluids: An iterative approach, *Math. Methods Appl. Sci.* **25**, doi: 10.1002/mma.331, pp. 1251–1280 (2002) (with R. Gormaz, E. Ortega-Torres & M. Rojas-Medar).

[60] Fourier approach to homogenization problems, *Esaim*: *Cocv Control, Optimisation and Calculus of Variations* **8**, doi: 10.1051/cocv:2002048, special issue dedicated to the memory of Professor J.L. Lions, pp. 489–511 (2002) (with M. Vanninathan).

[61] Numerical methods for elliptic partial differential equations with rapidly oscillating coefficients, *Comput. Methods Appl. Mech. Engrg.* **192**(1-2), pp. 47–76 (2003) (with S. Natesan).

[62] Approximate controllability and homogenization of a semilinear elliptic problem, *J. Math. Anal. Appl.* **285**(1), pp. 17–36 (2003) (with A. Osses & J. Saint Jean Paulin).

[63] A generalized strange term in Signorini's type problems, *Esaim: Modél. Math. Anal. Numer.* **37**(5), 10.1051/m2an:2003055, pp. 773–805 (2003) (with F. Murat & C. Timofte).

[64] Effective chemical processes in porous media, *Mathematical Models Methods Applied Sciences(M^3AS)* **13**(10), 10.1142/S0218202503002982, pp. 1–26 (2003) (with J.I. Díaz & C. Timofte).

[65] Homogenization in chemical reactive flows, *Electron. J. Diff. Eqns* **2004**(40), pp. 1–22 (2004) (with J.I. Díaz, A. Liñán & C. Timofte).

[66] On the homogenization of a transmission problem arising in chemistry, *Romanian Rep. Phys.* **56**(4), pp. 613–622 (2004) (with J.I. Díaz & C. Timofte).

[67] Bloch approximation on bounded domains, *Asymp. Anal.* **41**(1), pp. 71–91 (2005) (with R. Orive & M. Vanninathan).

[68] The Bloch approximation in periodically perforated media, *Appl. Math. Optim.* **52**(1), pp. 93–127 (2005) (with D. Gómez, M. Lobo & E. Pérez).

[69] Identification of immersed obstacles via boundary measurements, *Inverse Problems* **21**, 10.1088/0266-5611/21/5/003, pp. 1531–1552 (2005) (with C. Alvarez, L. Friz, O. Kavian & J. Ortega).

[70] On Burnett coefficients in periodic media, *J. Math. Physics* **47**, 10.1063/1.2179048, Article ID 032902 (2006) (with R. Orive & M. Vanninathan).

[71] Homogenization of a class of non-linear eigenvalue problems, *Proc. Roy. Soc. Edinburgh Sect. A* **136**(1), 10.1017/S0308210500004418, pp. 7–22 (2006) (with L. Baffico & M. Rajesh).

[72] Numerical experiments with the Bloch-Floquet approach in homogenization, *Internat. J. Numer. Methods Engrg.* **65**, 10.1002/nme.1502, pp. 1444–1471 (2006) (with S. Natesan & M. Vanninathan).

[73] Mathematical study of transport phenomena along a tuyère of the Teniente Converter, *Math. Problems Engrg.* **2006**, 10.1155/MPE/2006/23754 (2006), Article ID 23754 (12pp) (with J. San Martín, R. Gormaz, F-Z. Saouri, A. Benaddi, R. Fuentes & P. Ruz).

[74] On the homogenization of a semilinear problem arising in chemistry, in *Multi scale problems and asymptotic analysis*, vol. **24** of *Gakuto Internat. Ser. Math. Sci. Appl.*, Gakkōtosho, Tokyo, pp. 89–103 (2006) (with J.I. Díaz & C. Timofte).

[75] On Bloch waves for the Stokes equations, *Discrete Contin. Dyn. Syst. Ser. B* **7**, 10.3934/dcdsb.2007.7.1, pp. 1–28 (electronic) (2007) (with G. Allaire, L. Friz & J. Ortega).

[76] On the identification of a rigid body immersed in a fluid: A numerical approach, *Engrg. Anal. Boundary Elem.* **32**, pp. 919–925 (2008) (with C. Alvarez, R. Lecaros & J. Ortega).

[77] Direct integral decomposition for periodic function spaces and application to Bloch waves, *Networks and Heterogeneous Media* **3**(3), 10.3934/nhm.2008.3.555, pp. 555—566 (2008) (with L. Friz & J. Ortega).

[78] On the detection of a moving obstacle in an ideal fluid by a boundary measurement, *Inverse Problems* **24**(4), 10.1088/0266-5611/24/4/045001 (2008), Article ID 045001 (18pp), and Corrigendum, *Inverse Problems* **24**(5) (2008), Article ID 059802 (1p) (with P. Cumsille, J. Ortega & L. Rosier).

[79] On Burnett coefficients in periodic media in low contrast regime, *J. Math Physics* **49** (2008), Article ID 053514 (23pp) (with J. San Martín, L. Smaranda & M. Vanninathan).

[80] Detecting a moving obstacle in an ideal fluid by a boundary measurement, *C. R. Acad. Sci. Paris Sér. I Math.* **346**, 10.1088/0266-5611/24/4/045001, pp. 839–844 (2008) (with P. Cumsille, J. Ortega & L. Rosier).

[81] An extremal eigenvalue problem for a two-phase conductor in a ball, *Appl. Math. Optim.* **60**(2), 10.1007/s00245-008-9061-x, pp. 173–184 (2009) (with M. Rajesh & L. Sanz).

[82] Shape derivative for a two-phase eigenvalue problem and optimal configurations in a ball, *Esaim: Proceedings* **27**, 10.1051/proc/2009034, pp. 311–321 (2009) (with M. Rajesh & L. Sanz).

[83] Optimal bounds on dispersion coefficient in one dimensional periodic media, *Mathematical Models Methods Applied Sciences (M^3AS)* **19**(9), 10.1142/S0218202509003930, pp. 1743–1764 (2009) (with J. San Martín, L. Smaranda & M. Vanninathan).

[84] A level set-immersed interfase hybrid method for simulating biofilm evolution (Spanish), *Rev. Integr. Temas Mat.* **27**(1), pp. 25–36 (2009) (with P. Cumsille).

[85] Un problema extremal para un conductor de dos fases en una bola, *Boletín de la Sociedad Española de Matemática Aplicada* **47**, pp. 81–90 (2009) (with M. Rajesh & L. Sanz).

[86] Detection of a moving rigid solid in a perfect fluid, *Inverse Problems* **26**, http://iopscience.iop.org/0266-5611/26/9/095010 (2010) Article ID 095010 (18pp) (with M. Muslim & A. Munnier).

[87] Approximation of solutions to fractional integral equations, *Computers and Mathematics with Applications* **59**, 10.1016/j.camwa.2009.06.028, pp. 1236–1244 (2010) (with M. Muslim & A. K. Nandakumaran).

[88] Remarks on the blowup and global existence for a two species chemo-tactic Keller-Segel system in R^2, *Euro. Jnl. of Applied Mathematics* **22**, 10.1017/S0956792511000258, pp. 553–580 (2011) (with E. Espejo & K. Vilches).

[89] Threshold for the global existence of the non-radial solutions to a drift-diffusion system in dimension two, *Appl. Math. Letters*, **25**(3), pp. 352–356 (2011) (with E. Espejo).

[90] Burnett coefficients and laminates, *Applicable Analysis* **91**(6), 10.1088/0266-5611/28/1/015005 (2011) (with J. San Martín, L. Smaranda & M. Vanninathan).

[91] On the identifiability of a rigid body moving in a stationary viscous fluid, *Inverse Problems*, **28**, 10.1080/-00036811.2011.625017 (2011) (with E. Schwindt & T. Takahashi).

[92] Minimization of the ground state for two phase conductors in low contrast regime, *Siam J. Appl. Math.* **72**(4), 10.1137/110847822, pp. 1238–1259 (2012) (with A. Laurain & M. Rajesh).

[93] Sharp condition for blow-up and global existence in a two species chemotactic Keller-Segel system in R^2, *Euro. Jnl. of Applied Mathematics*, 10.1017/S09567925112000411, pp. 1–17 (2013) (with E. Espejo & K. Vilches).

[94] A novel model for biofilm growth and its resolution by using the hybrid immersed interface-level set method, *Computers and Mathematics with Applications* **67**, doi.org/10.1016/j.camwa.2013.10.008, pp. 34–51 (2014) (with P. Cumsille & J. Asenjo).

[95] Determination of the Calcium channel distribution in the olfactory system, *J. Inverse Ill-Posed Probl. 22*, doi-org.insmi.bib.cnrs.fr/10.1515/jip-2013-0033, pp. 671–711 (2014) (with R. Lecaros, J. Ortega & L. Rosier).

[96] Identifiability and stability of an inverse problem involving a Fredholm equation, *Chin. Ann. Math. 36B*(5), 10.1007/s11401-015-0974-9, pp. 737–762 (2015) (with R. Lecaros, J. Ortega & L. Rosier).

[97] Boussinesq system with non-homogeneous boundary conditions, *Appl. Math. Lett.* **53**, dx.doi.org/10.10-16/j.aml.2015.09.015, pp. 39–44 (2016) (with P. Acevedo & Ch. Amrouche).

[98] Minimisation of the ground state of the mixture of two conducting materials in a small contrast regime, *Math. Methods Appl. Sci.* **39**, 10.1002/mma.3797, pp. 3549–3564 (2016) (with M. Dambrine, D. Quinteros & R. Mahadevan).

[99] Asymptotic analysis of optimal controls of a semilinear problem in a perforated domain, *J. Ramanujan Math. Soc.* **31**(3), pp. 265–305 (2016) (with P. Donato, E. D. José & I. Mishra).

[100] On the detection of several obstacles in 2D Stokes flow : Topological sensitivity and combination with shape derivatives, *Inverse Problems & Imaging* **10**(2), 10.3934/ipi.2016003, pp. 327–367 (2016) (with F. Caubet & M. Godoy).

[101] Approximate controllability of a semilinear elliptic problem with Robin condition in a periodically perforated domain, *Electron. J. Diff. Eqns.* **2017**(186), pp. 1–24 (2017) (with N. Agarwal & I. Mishra).

[102] The dispersion tensor and its unique minimizer in Hashin-Shtrikman micro-structures, *Arch. Rational Mech. Anal.* **230**(2), doi.org/10.1007/s00205-018-1255-z, pp. 665–700 (2018) (with L. Bălilescu, T. Ghosh, J. San Martín & M. Vanninathan).

[103] Determining the distribution of ion channels from experimental data, *Mathematical Modelling and Numerical Analysis (ESAIM: M^2AN)* **52**(5), doi.org/10.1051/m2an/2017062, pp. 2083–2107 (2019) (with Th. Bourgeron & R. Lecaros).

[104] L^p theory for Boussinesq system with Dirichlet boundary conditions, *Applicable Analysis* **98**(1&2), doi.org/10.1080/00036811.2018.1530762, pp. 272–294 (2019) (with P. Acevedo & Ch. Amrouche).

[105] A semilinear system with positivity conditions, *SeMA J.* **76**(1), doi.org/10.1007/s40324-018-0166-0, pp. 143–152 (2019) (with R. Gormaz & J. San Martín)

[106] A simultaneous blow-up problem arising in tumour modelling, *J. Math. Biol.* **79**(4), doi.org/10.1007/s00-285-019-01397-6, pp. 1357–1399 (2019), (with E. Espejo & K. Vilches).

[107] Stokes and Navier-Stokes equations with a Navier boundary condition, *C. R. Acad. Sci. Paris Sér. I Math.* **357**, doi.org/10.1016/j.crma.2018.12.002, pp. 115–119 (2019) (with P. Acevedo, Ch. Amrouche & A. Ghosh).

[108] Junction of models of different dimension for flows in tube structures by Womersley-type interface conditions, *Siam J. Appl. Math.* **79**(3), 10.1137/18M1229572, pp. 959–985 (2019) (with C. Bertoglio, D. Nolte, G. Panasenko & K. Pileckas).

[109] On the graphene Hamiltonian operator, *Comput. & Appl. Math.* **39**(1), doi.org/10.1007/s40314-019-0986-2, pp. 8–29 (2020) (with R. Orive, J. San Martín & V. Solano).

[110] A mathematical basis for the graphene, *Comput. & Appl. Math.* **39**(1), doi.org/10.1007/s40314-019-0993-3, pp. 19–52 (2020) (with J. San Martín & V. Solano).

[111] Uniform $W^{1,p}$ estimates for an elliptic operator with Robin boundary condition in a $\mathcal{C}^1$ domain, *Calc. Var. & PDE's* **59**(2), doi.org/10.1007/s00526-020-1713-y (2020) (with Ch. Amrouche, A. Ghosh & T. Ghosh).

[112] Stokes and Navier-Stokes equations with Navier boundary conditions, *J. Diff. Eqns.* **285**, doi.org/10.101-6/j.jde.2021.02.045, pp. 258–320 (2021) (with P. Acevedo, Ch. Amrouche & A. Ghosh).

[113] The maximization of the p-Laplacian energy for a two-phase material, *Siam J. Control Optim.* **59**(2), 10.1137/20M1316743, pp. 1497–1519 (2021) (with J. Casado-Díaz & D. Vásquez).

[114] Numerical maximization of the p-Laplacian energy of a two-phase material, *Siam J. Numer. Anal.* **59**(6), doi.org/10.1137/20M1353563, pp. 3077–3097 (2021) (with J. Casado-Díaz & D. Vásquez).

[115] Minimization of the p-Laplacian first eigenvalue for a two-phase material, *J. Comput. Appl. Math.* **399**(1), doi.org/10.1016/j.cam.2021.113722 (2022) (with J. Casado-Díaz & D. Vásquez).

[116] Bloch wave spectral analysis in the class of generalized Hashin-Shtrikman micro-structures, *Mathematical Models Methods Applied Sciences (M^3AS)* **32**(3), 10.1142/S0218202522500129, pp. 497–532 (2022) (with L. Bălilescu, T. Ghosh, J. San Martín & M. Vanninathan).

[117] A class of solutions for the graphene Hamiltonian operator, in *Math. Reports* **24(74)**(1-2), pp. 139–157 (2022) (with J. San Martín & V. Solano).

[118] Approximate controllability of a semilinear elliptic problem in periodically perforated domains, *J. Math. Anal. Appl.* **530**, doi.org/10.1016/j.jmaa.2023.127676, pp. 265–305 (2024) (with E.D. José & I. Mishra).

[119] A parabolic multiscale inverse problem approached via homogenization: A numerical method, *J. Math. Anal. Appl.* **544**, doi.org/10.1016/j.jmaa.2024.129073, pp. 1–27 (2025) (with V. Ocqueteau, R. Gormaz & J. San Martín).

[120] How to Insulate a Pipe?, *J. Optim. Theory Appl. (JOTA)* **207:46**, doi.org/10.1007/s10957-025-02782-6 (2025) (with F. Caubet, M. Dambrine & R. Zelada).

(b) **Refereed Journal Publications** (resulting from research direction in the use of Mathematics in Engineering, Natural and Applied Sciences; Associative research)

[121] Mathematical modelling of the dynamic storage of iron in ferritin, *BMC Systems Biology* **4**, 147 (2010) (with J.C. Salgado, A. Olivera-Nappa, Z. Gerdtzen, V. Tapia, E. Theil & M.T. Núñez).

[122] Higher order macro coefficients in periodic homogenization, *Journal of Physics: Conference Series* **319**, 10.1088/1742-6596/319/1/012020 (2011) (with J. San Martín, L. Smaranda & M. Vanninathan).

[123] Existence of local and global solutions of fractional order differential equations, *Nonlinear Oscillations* **14**(1), pp. 76–84 (2011) (with M. Muslim & R. P. Agarwal).

[124] Proposal of a hybrid approach for tumour progression and tumour-induced angiogenesis, *Theoretical Biology and Medical Modelling* **12:13**, 10.1186/s12976-015-0009-y (2015) (with P. Cumsille, A. Coronel, C. Quiñinao & C. Escudero).

[125] Parameter estimation and mathematical modelling for the quantitative description of therapy failure due to drug resistance in gastrointestinal stromal tumour metastasis to the liver, *PLoS ONE* **14**(5), doi.org/10.1371/journal.pone.0217332 (2019) (with P. Cumsille, M. Godoy & Z.P. Gerdtzen).

[126] A system biology approach for studying *Wolbachia* metabolism reveals points of interaction with its host in the context of arboviral infection, *PLoS Negl Trop Dis* **13**(8), doi.org/10.1371/journal.pntd. 0007678 (2019) (with N.E. Jiménez, Z.P. Gerdtzen, A. Olivera-Nappa & J.C. Salgado).

[127] A novel synthetic model of the glucose-insulin system for patient-wise inference of physiological parameters from small-size OGTT Data, *Front. Bioengrg. Biotech., section Bioinformatics and Computational Biology* **8**, 10.3389/fbioe.2020.00195 (2020) (with S. Contreras, D.A. Medina & A. Olivera-Nappa).

[128] Novel symbiotic genome-scale model reveals Wolbachia's arboviral pathogen blocking mechanism in Aedes aegypti, *mBio* **12**(5), doi.org/10.1128/mBio.01563-21 (2021) (with N.E. Jiménez, Z.P. Gerdtzen, A. Olivera-Nappa & J.C. Salgado).

[129] Patient-wise methodology to assess glycemic health status: Applications to quantify the efficacy and physiological targets of polyphenols on glycemic control, *Front. Nutr.* **17**, doi.org/10.3389/fnut.2022.831-696 (2022) (with A. Olivera-Nappa, S. Contreras, M.F. Tevy, D. Medina-Ortíz, A. Leschot, P. Vigil).

[130] Model-based assessment of sampling protocols for infectious disease genomic surveillance, *Chaos, Solitons and Fractals* **167**, doi.org/10.1016/j.chaos.2022.113093 (2023) (with S. Contreras, K. Oróstica, A. Daza-Sánchez, J. Wagner, Ph. Dönges, D. Medina-Ortíz, M. Jara, R. Verdugo, V. Priesemann & A. Olivera-Nappa).

[131] A general modelling framework for quantitative tracking, accurate prediction of ICU, and assessing vaccination for COVID-19 in Chile, *Frontiers in Public Health Sec. Infectious Diseases: Epidemiology and Prevention* **11**, doi:10.3389/fpubh.2023.1111641 (2023) (with P. Cumsille & O. Rojas-Díaz).

[132] The risk of high-biomass HABs: Triggers and dynamics of a non-toxic bloom F of Prorocentrum micans in Chilean Patagonia, *Science of the Total Environment* **958**, doi.org/10.1016/j.scitotenv.2024.178140 (2025) (with P. Díaz et al.).

[133] Unveiling Wolbachia transcriptomic signature in the arboviral vector Aedes aegypti, *Front. Cell. Infect. Microbiol.*, 10.3389/fcimb.2025.1538459 (2025) (with S. Mejías, N.E. Jiménez, Z.P. Gerdtzen & J.C. Salgado).

[134] Unveiling the 2017 Karenia bloom in NW Chilean Patagonia by integrating remote sensing and field data, *Microorganisms*, www.mdpi.com/2076-2607/13/11/2440 (2025) (with P. Díaz et al.).

[135] A robust modeling framework to investigate transmissible diseases: COVID-19 in Chile as a case study, *Front. Public Health*, 10.3389/fpubh.2025.1718363 (2026) (with P. Cumsille & O. Rojas-Díaz).

[136] Geometric deep learning assists protein engineering. Opportunities and Challenges, *Biotech. Adv.*, doi.org/10.1016/j.biotechadv.2025.108790 (2026) (with D. Medina-Ortíz et al.).

(c) **Book Chapters and Symposia Papers**

[137] Résolution des équations bidimensionelles de Navier-Stokes pour un fluide incompressible et visqueux en régime stationnaire, from *Proceedings of the Annual Modulef Symposium*, I.N.R.I.A. eds., Versailles (1983) (with D. Steer).

[138] Mathematical modelling of the steam-water condensation in a condenser, in *Large-Scale Computations in Fluid Mechanics I*, B. Engquist & al. eds., Lectures in Applied Mathematics **22**, pp. 87–98, AMS, Providence, Rhode-Island (1985).

[139] Un problème de fréquences propres en couplage fluide-structure, from *Proceedings of the VIII International Conference on Computing Methods in Applied Sciences & Engineering*, I.N.R.I.A. eds., pp. 423–438, Rocquencourt (1988) (with J. Planchard & M. Vanninathan).

[140] Les équations de Stokes et de Navier- Stokes avec des conditions aux limites sur la pression, in *Nonlinear Partial Differential Equations and their Applications, vol. IX*, H. Brezis & J.-L. Lions eds., pp. 179–264, Pitman Research Notes in Mathematics Series **181**, Longman Scientific & Technical, Harlow (1988) (with C. Bègue, F. Murat & O. Pironneau).

[141] Added mass and eigenfrequencies of large tube bundles in a fluid, from *Proceedings of the 2^{nd} World Congress on Computational Mechanics*, I.A.C.M. eds., pp. 499–502, Stuttgart (1990) (with F. Aguirre, J. Planchard & M. Vanninathan).

[142] Bloch decomposition of an eigenvalue problem involving Helmholtz equation, in *Applied Mathematics for Engineering Sciences*, C. Carasso et al. eds., pp. 155–164, Cépaduès-Editions, Toulouse (1991).

[143] Limiting behaviour of the spectrum of large elastic tube arrays in a fluid, in *Numerical Methods in Engineering and Applied Sciences, Part I*, H. Alder et al. eds., pp. 128–136, CIMNE Publications, Barcelona (1992) (with J. Planchard & B. Thomas).

[144] Asymptotic analysis of a multidimensional plate-beam model, in *Asymptotic Methods for Elastic Structures*, P.G. Ciarlet, L. Trabucho & J. Viaño eds., pp. 275–291, Walter de Gruyter & Co., Berlin · New York (1993) (with E. Zuazua).

[145] Spectral problems in fluid-solid structures, in *Recent Advances in Partial Differential Equations*, M.A. Herrero & E. Zuazua eds., pp. 19–35, Collection RMA **30**, John Wiley & Sons/Masson, Paris · New York (1994).

[146] Homogenization of a transmission problem in 2D elasticity, in *Computational Science for the 21^{st} Century*, in honor of Professor R. Glowinski on the occasion of his 60^{th} birthday, M-O. Bristeau et al. eds., pp. 539–548, J. Wiley & Sons, Paris · New York (1997) (with L. Baffico).

[147] Optimal bounds for mixtures of infinitely many materials, in *Numerical Methods in Mechanics*, C. Conca & G. Gatica eds., pp. 59–69, Addison Wesley/Longman Scientific & Technical, Harlow (1997) (with J.D. Dávila).

[148] The Bloch transform and applications, in *Proceedings from the 29^{th} French National Conference on Numerical Analysis*: *CANum'97*. *ESAIM: Proceedings*, Vol. 3 (1997), pp. 1–131, M. Ahues et al. eds., (URL http://www.emath.fr/proc/Vol.3/), pp. 65–84 (with G. Allaire & M. Vanninathan).

[149] Bloch waves, in *Encyclopaedia of Mathematics*, M. Hazewinkel & R. Hoksbergen eds., Kluwer Academic Publishers, Amsterdam (1999).

[150] Análisis de ondas de Bloch y correctores en homogeneización, from *Proceedings of the XVI CEDYA, Spanish Congress on Differential Equations and Applications*, A. Plaza et al. eds., pp. 241–246, Las Palmas de Gran Canaria (1999) (with R. Orive & M. Vanninathan).

[151] Asymptotic behaviour in R^N for linear parabolic equations with periodical oscillating coefficients, from *Proceedings of the 51^{st} Brazilian Seminar of Analysis*, SBA eds., pp. 163–178, Universidad Federal de Santa Catarina (2000) (with J. Ortega).

[152] Correctors in homogenization via Bloch decomposition, from *Proceedings of the International Workshop on Asymptotic and Numerical Analysis of Structures and of Heterogeneous Media (ANASTHEM)*, G. Panasenko ed., pp. 46–50, Saint Petersburg State Technological University (2000).

[153] Numerical solution of elliptic partial differential equations by Bloch waves method, from *Proceedings of the XVII CEDYA / VII CMA Spanish Congress on Differential Equations and Applications*, L. Ferragut et al. eds., pp. 63–84, Salamanca (2001) (with S. Natesan & M. Vanninathan).

[154] Ondas de Bloch en homogeneización de medios periodicamente perforados, from *Proceedings of the XVII CEDYA / VII CMA Spanish Congress on Differential Equations and Applications*, L. Ferragut et al. eds., pp. 617–618, Salamanca (2001) (with D. Gómez, & M. Lobo & M.E. Pérez).

[155] Numerical solution of elliptic partial differential equations with rapidly oscillating coefficients by Bloch wave method, from *Proceedings of the 2nd International Conference on Theoretical, Applied, Computational, and Experimental Mechanics (ICTACEM 2001)*, Indian Institute of Technology (IIT), Paper **112**, Kharagpur, India (2001) (with S. Natesan & M. Vanninathan).

[156] Existence and uniqueness of a strong solution for non-homogeneous micropolar fluids, in *Nonlinear Partial Differential Equations and their Applications, vol. XIV*, D. Cioranescu et al. eds., pp. 213–242, Studies in Mathematics and its Applications **31**, Elsevier Science B.V., Amsterdam · Boston · New York · Tokyo (2002) (with R. Gormaz, E. Ortega-Torres & M. Rojas-Medar).

[157] Bloch wave homogenization and spectral asymptotic analysis, in *Homogenization and Applications to Material Sciences. In memoriam to Professor Jeannine Saint Jean Paulin*, Şt. Balint et al. eds., pp. 7–22, HMS 2000, University of the West Timişoara, Editura Universităţii de Vest & West University Press, Timişoara (2002) (with G. Allaire).

[158] Análisis de la fusión de carga fría al interior de un Convertidor Teniente: Simulación numérica de un modelo físico, in *Mecánica Computacional vol. XXI*, special issue from *Proceedings of the First South-American Congress on Computational Mathematics (MECOM* 2002), S. R. Idelshon et al. eds., pp. 2875–2888, Santa-Fe–Paraná, Argentina (2002).

[159] Numerical simulation of reverts smelting in a Teniente Converter, in *Proceedings from Copper 2003. The 5th International Conference-Volume IV (Book 2): Pyrometallurgy of Copper. Hermann Schwarze Symposium*, C. Díaz et al. eds., pp. 251–261, Santiago, Chile (2003) (with R. Paredes, P. Ruz, R. Fuentes & M. Cruchaga).

[160] Accretion growth in metallic fluid media, in *Proceedings from Copper 2003. The 5th International Conference-Volume IV (Book 2): Pyrometallurgy of Copper. Hermann Schwarze Symposium*, C. Díaz et al. eds., pp. 499–513, Santiago, Chile (2003) (with P. Ruz, R. Fuentes, R. Paredes, M. Rosales & A. Badillo).

[161] Mathematical study of a compressible fluid in a tuyere, in *Proceedings from Copper 2003. The 5th International Conference-Volume IV (Book 2): Pyrometallurgy of Copper. Hermann Schwarze Symposium*, C. Díaz et al. eds., pp. 515–528, Santiago, Chile (2003) (with J. San Martín, F. Saouri, A. Benaddi, R. Fuentes, M. Rosales & P. Ruz).

[162] Interactive oscillation sources in Signorini's type problems, in *Partial Differential Equations and Inverse Problems, Proceedings from the Pan-American Advanced Studies Institute on Partial Differential Equations, Nonlinear Analysis and Inverse Problems*, C. Conca et al. eds., pp. 381–392, Contemporary Mathematics **362**, American Mathematical Society, Providence, Rhode Island (2004) (with C. Timofte).

[163] Homogenization results for chemical reactive flows through porous media, in *New Trends in Continuum Mechanics. Conference Proceedings, Constanta (România), September 2003*, Mihaela Mihăilescu-Suliciu ed., pp. 99–107, Theta Series in Advances Mathematics **3**, Arta Grafică, Bucareşti (2005) (with J.I. Díaz, A. Liñan & C. Timofte).

[164] Estudio de emisiones de material particulado en un yacimiento de Cobre en superficie, poster presentation in FLUIDOS-2006, IX Reunión sobre Recientes Avances en Física de Fluidos y sus Aplicaciones, Universidad Nacional Cuyo, Mendoza, Argentina (2006) (with A. Alvarez, F. Mujica, R. Fuentes, R. Lecaros, J. Campos, F. Macías, O. Vásquez).

[165] Periodic homogenization problems in incompressible fluid equations, in *Handbook of Mathematical Fluid Dynamics*, Vol. 4, S. Friedlander & D. Serre eds., DOI: 10.1016/S1874-5792(07)80013-9pp. 649–699, Elsevier Science & North Holland, Amsterdam (2007) (with M. Vanninathan).

[166] Primer y segundo corrector en homogeneización por ondas de Bloch, from *Proceedings of the 1st Ibero-American Workshop on Applied Mathematics*, R. Cabrales et al. eds., Chillán, vol. **43** (June 2008) of Bulletin of the Spanish Society of Applied Mathematics, pp. 61–69 (with R. Orive & M. Vanninathan).

[167] An extremal eigenvalue problem for a two-phase conductor in a ball, poster in *Workshop on Variational Analysis*, CMM-University of Chile, November 2008 (with M. Rajesh & L. Sanz).

[168] Un método híbrido interfaz inmersa-conjunto de nivel para la simulación de la evolución de una biopelícula, from *Proceedings from the XXI CEDYA / XI* CMA *Spanish Congress on Differential Equations and Applications*, E. Fernández-Cara et al. eds., pp. 1–8, Ciudad Real (2009) (with P. Cumsille).

[169] On Burnett coefficients in periodic media with two-phases, in *Integral Methods in Science and Engineering. Volume 1: Analytical Methods*, Ch. Constanda & M.E. Pérez eds., pp. 123–133, Birkhäuser Boston (2010) (with J. San Martín, L. Smaranda & M. Vanninathan).

[170] Modelamiento matemático de crecimiento de tumores, acoplado con angiogénesis tumoral y su uso en la investigación de nuevas estrategias de tratamiento del cáncer, from *Proceedings from IIIrd Workshop IberoAmericano de Matemáticas Aplicadas*, SeMA Proceedings eds., pp. 1–13, University of Bío-Bío Chillán (2010) (http://www.sema.org.es/web/content/view/1061/87/lang,spanish/) (with T. Colin, P. Cumsille, C. Quiñinao & O. Saut).

[171] A kinetic model for the storage of iron in ferritin, from *Proceedings of the 2011 Annual Meeting of the American Institute of Chemical Engineers*, p. 623 (2011) (with J.C. Salgado, A. Olivera-Nappa, Z. Gerdtzen, V. Tapia & M.T. Núñez).

[172] El Convertidor Teniente. Un caso emblemático de innovación tecnológica, Chapter Nº9 in the book entitled : *Innovación Basada en Conocimiento Cientfico. Estudio en Homenaje a los 50 años del Instituto de Chile y la Academia Chilena de Ciencias*, B. Santelices et al. eds., pp. 187–211, Gráfica Andes (2013) (with R. Fuentes, R. Gormaz, P. Ruz & L. Voisin).

[173] A mathematical model for the vane method, from *Proceedings from the 2nd International Seminar on Tailings Management, Tailings 2014*, S. Barrera ed., Publicaciones GECAMIN (2014) (with R. Fuentes & M. Larenas) (http://gecamin.com/tailings/2014/english/proceedings-cierre).

[174] Numerical solution of a novel biofilm growth model, in *Nonlinear Dynamics: Materials, Theory and Experiments. Proceedings from 3rd Dynamics Days South America, Valparaíso (Chile), November 2014*, Mustapha Tlidi & Marcel G. Clerc eds., pp. 207–222, Springer Proceedings in Physics **173**, Springer-Verlag, Berlin (2016) (with P. Cumsille & J. Asenjo) (link.springer.com/chapter/10.1007/978-3-319-24871-4_16/fulltext.html).

[175] The entropy solution to the evolution of a bedform in a closed conduit, in Revista de la Sociedad Chilena de Hidraúlica (SOCHID), Special issue dedicated to the Memory of Professor Ramón Fuentes Aguilar (1938-2021), pp. 107–120 (2021) (with B. Obando, R. Gormaz, J. San Martín & A. Tamburrino).

[176] Modelling our sense of smell, in *Recent Advances in Industrial and Applied Mathematics*, T. Chacón et al. eds., pp. 38–55, SEMA-SIMAI Springer Series **1**, Springer Nature (2022) (https://doi.org/10.1007/978-3-030-86236-7_3)

[177] Bloch spectral analysis in the class of non-periodic laminates, in *International Conference on Applied Mathematics and Numerical Methods (ITM Web of Conferences) - fourth edition (ICAMNM 2022)* **49**, 02001, doi.org/10.1051/itmconf/20224902001 (2022) (with L. Bălilescu, T. Ghosh, J. San Martín & M. Vanninathan).

[178] A general modelling framework for quantitative tracking, accurate prediction of ICU, and assessing vaccination for COVID-19 in Chile, Chapter Nº9 in *Lessons and Policy consequences of Mathematical Modelling in relation to Ongoing Pandemics*, Th. Gyle Lewis, P. Ferrante and W.I. Al Mannaieds eds., pp. 89–105, Frontiers in Public Health (2023) (with P. Cumsille & O. Rojas-Díaz).

[179] Shape optimisation for heat exchangers with a thin layer, in *XVI International Conference Zaragoza-Pau on Mathematics and its Applications*, J.L. Gracia et al. eds., pp. 51–61, Monografías Matemáticas García de Galdeano **43** (2024) (with F. Caubet, M. Dambrine & R. Zelada). (http://pcmap.unizar.es/jaca2024/PDFXVI/06Caubet.pdf).

(d) **Non-Referred Journal Publications**

[180] Un problema de dos puntos, *Revista Sigma* **1**, pp. 23–24 (1975) (with F. Utreras).

[181] Sobre una aplicación de las funciones splines bidimensionales a la obtención de curvas de nivel, *Revista Sigma* **3**, pp. 27–43 (1978) (with F. Hernández).

[182] Solución de una ecuación del calor no-lineal por elementos finitos, *Revista Sigma* **5**, pp. 313–322 (1979) (with M. Bustos).

[183] Aplicación del método de elementos finitos a la determinación de la carga espacial de semi conductores bajo una unión p-n, *Revista Sigma* **5**, pp. 323–332 (1979) (with R. Feliú & H. Jensen).

[184] Pasatiempos Matemáticos, *Revista Sigma* **1**(1), pp. 32–34 (1975); **2**(1), pp. 58–61 (1975); **2**(2), pp. 41–42 (1975); **2**(3), pp. 56–57 (1976); **2**(4), pp. 39–40 (1976); **3**(1), pp. 45–46 (1977); **3**(2), pp. 41–42 (1977); **3**(4), pp. 61–61 (1977) (with A. Fischer).

[185] Problemas espectrales en ingeniería, *Revista Cubo* **6**, pp. 97–148 (1990).

[186] Conca C., Ondas y Aproximación de Bloch, in *Anales Academia Chilena de Ciencias* **9**, pp. 67–71 (2001-2007).

[187] Conca C., Una Visión Evolutiva de la Inteligencia Social, Medwave, Año IX, Nº 2, February 2009 (http://www.mednet.cl/link.cgi/Medwave/Temas/3774).

[188] Duarte-Mermoud M.A., Mackinnon J., Conca C., Beltrán N. (Q.E.P.D.), Johnson V. & Maureira R., TAOTE, un dispositivo de ecografía ultra portátil, de bajo costo y bajo consumo de energía, en *Revista Chilena de Ingeniería* **479** and *Anales del Instituto de Ingenieros de Chile* **128**, pp. 53–62 (2017).

[189] Conca C., An inverse problem in the mathematical modelling of our sense of smell, *Revista de Modelamiento Matemático de Sistemas Biológicos* **1**(1), pp. 8–15 (2021).

C.- **Books Edited**

[190] C. Carasso, C. Conca, R. Correa & J.-P. Puel eds., *Applied Mathematics for Engineering Sciences*, Cépaduès-Editions, Toulouse (1991).

[191] C. Conca & G. Gatica eds., *Numerical Methods in Mechanics*, Pitman Research Notes in Mathematics **371**, Addison Wesley - Longman Scientific & Technical, Harlow (1997).

[192] C. Conca et al. eds., *Current Developments in Partial Differential Equations*, special issue of Discrete and Continuous Dynamical Systems **8**(2), pp. 289–518, American Institute of Mathematical Sciences (2002) (http://AIMsciences.org).

[193] C. Conca et al. eds., *Partial Differential Equations and Inverse Problems, Pan-American Advanced Studies Institute on Partial Differential Equations, Nonlinear Analysis and Inverse Problems*, Contemporary Mathematics **362**, American Mathematical Society, Providence, Rhode Island (2004).

D.- **Others**

[194] Baeza R., Conca C., Friedman E., Del Pino M., Jofré A., Maass A., Manásevich R., Palma W., Rebolledo R., Rivera-Letelier J. & Rodríguez R., *Análisis y Proyección de la Ciencia Chilena 2005, Ciencias Matemáticas*, Academia Chilena de Ciencias, Consejo de Sociedades Científicas de Chile, Programa Bicentenario de Ciencia y Tecnología Conicyt (2006).

[195] Bourgeron Th., Conca C. & Lecaros R., Modelling our sense of smelling, London Mathematical Society Newsletter, Issue: 474 - January 2018, pp. 34–39.

6.- Patents

in the U.S.A.

- **Nº US 10,548,565 B2**, entitled: "Manual, portable ultrasonography device, with centralized control and processing in the hardware and with display outputs, which operates in real-time with a high image refresh rate". Published by the U.S.A. Department of Commerce / U.S.A. Patent and Trademark Office in February 4, 2020 (Invention shared with N. Beltrán (Q.E.P.D.), M. Duarte, J. Mackinnon, R. Maureira & V. Johnson).

in Chile

- **Nº 947-2013**, entitled : "Dispositivo de ecografía portátil y manual, con control lógico y procesamiento de datos en una plataforma configurada por una unidad FPGA, con bloques lógicos de hardware interconectados para formar módulos de control general y de emisión de pulsos, un módulo de conformación de ondas y un módulo de procesamiento de imágenes; Método para generar imágenes con dicho dispositivo". Published in the Diario Oficial de la República de Chile, March 3rd 2018 (Invention shared with N. Beltrán (Q.E.P.D.), M.A. Duarte-Mermoud, J. Mackinnon & R. Maureira).

7. Membership of

• Editorial Boards

- *Mathematical Models Methods Applied Sciences (M^3AS)*, World Scientific Publishing Co. Pte. Ltd., New Jersey · London · Singapore (ISI impact factor 3.15).
- *Computational & Applied Mathematics*, Springer Verlag.
- *SeMa Journal*, Springer Verlag.
- *Journal de l'Ecole Polytechnique - Maths*, Ecole Polytechnique de Paris.
- *International J. Mathematical Sciences Medicine*, University of South Florida.
- *Journal of Applied Mathematics (JAM)*, Hindawi Publishing Corp., New York · Nasr City, Cairo.
- *Research in Applied Mathematics (RAM)*, AgiAl Publishing House, Giza, Egypt.
- *Collection de Mathématiques Appliquées Niveau Master*, SMAI-FRANCE, Editions Belin, Paris.
- *The Open Access Journal of Science and Technology (OAJoST)*, AgiAl Publishing House, Giza, Egypt.
- *Proyecciones*, Universidad Católica del Norte, Antofagasta, Chile (www.scielo.cl).
- *Ciencia Abierta*, Universidad de Chile, Santiago, Chile (www.cec.uchile.cl/ cabierta/).

• Professional Bodies

- Member of the "Sociedad Matemática de Chile" (SOMACHI), American Mathematical Society (AMS), Society for Industrial and Applied Mathematics (SIAM), "Societé de Mathématiques Apliquées et Industrielles de France" (SMAI).

8.- Grants and Research Contracts

- MECESUP: Director del Proyecto de la Dirección de Pregrado de la Universidad de Chile, titulado: *Optimización de la gestión académica y diseño para el desarrollo de la formación general integrada de los estudiantes de pregrado* ($1.200 MM, 3 años).
- FONDEF: Director of the 3-years bi-institutional project, University of Chile - IM2 Codelco Chile, entitled: *Interface-dynamical models in fusion, conversion and refinement of copper phenomena*.
- FONDECYT (National Science Committee): Project Leader of the following 3-year proposals: N^{o} 549-89, N^{o} 1201-91, N^{o} 194-0494 and N^{o} 197-0734, N^{o} 1140773 (4 años).
- FONDAP: Director of the National Program entitled *Mathematical Mechanics*.
- ECOS–CONICYT and INRIA–CONICYT (Chilean-French International Scientific Agreements): Financial contribution to specific scientific projects, visiting positions of french professors, travels and subsistences expenses of stays in France, fellowships; since 1979.
- CEE (Commission of the European Communities): Research Contract N^{o} CI1* CT93-0046, *Nonlinear Mathematical Modeling* (from 1993 to 1996). Project LAMBDA of the CEE Program named ALFA (a 5 years Grant).
- FUNDACIÓN ANDES: Financial contribution for visiting positions of foreign professors and fellowships for PhD. students.

9.- Experience in Administration, National Responsabilities

- Head Founder of the Master and Ph.D Program in Mathematical Modelling and Applied Mathematics, University of Chile (1988-1989).
- Head of the Computer Center of the University of Chile (August 1988 - December 1989).
- Head of the Department of Mathematical Engineering of the University of Chile (January 1989 - May 1991 and from January to May 1996).
- Member of the Academic Evaluation Committee for the "Facultad de Ciencias Físicas y Matemáticas", University of Chile, from 1997 to 2000, and President of the same Committee during 2001.
- Member of the Main Academic Evaluation Committee for the University of Chile, from 1997 to 2009. President of the same Committee from 2004 to 2009.
- co-Founder of the Master and Ph.D Program in Fluid-Dynamics, University of Chile (2006-2017).

10.- Research Advisor and Thesis Guidance

• *Research Advisor of the following researchers*:

- Freddy Aguirre Astorga, Mathematical Engineering Diploma (1984); joint papers : [9].

- Mauricio Sepúlveda Contreras, Mathematical Engineering Diploma (1988), Docteur de l'Ecole Polytechnique de Paris (1993), Associate Professor, University of Concepción; joint papers : [17].

- Rodrigo Schiefelbein Grossen, Mathematical Engineering Diploma (1988)

- Mario Durán Toro, Mathematical Engineering Diploma (1991), Docteur de l'Ecole Polytechnique de Paris (1996), Full Professor, Pontificial Catholic University of Chile; joint papers : [19], [20], [21], [22], [27], [32], [39].

- Axel Osses Alvarado, Mathematical Engineering Diploma (1994), Docteur de l'Ecole Polytechnique de Paris (1998), Associate Professor, University of Chile; joint papers : [37], [41], [57], [62].

- Leonardo Baffico Haramoto, Mathematical Engineering Diploma (1996), Ph.D. by both institutions the University of Chile and the University Pierre et Marie Curie, Paris VI (2001); Maître de Conférences, University of Caen, Basse Normandie, France; joint papers : [49], [52], [56], [71], [94].

- Juan-Diego Dávila Bonczos, Mathematical Engineering Diploma (1996); Ph.D. from the State University of New Jersey, Rutgers-USA (2002), Full Professor, University of Chile; joint papers : [95].

- Lilian Salinas Ayala, Mathematical Engineering Diploma (1998).

- Alejandro Omón Arancibia, Mathematical Engineering Diploma (2000), Ph.D. from the UMIST, Manchester- England (2004); Associate Professor, Universidad de la Frontera, Temuco.

- Jaime Reséndiz Barrón, Ph.D. in Mathematical Modelling, University of Chile (2001), Associate Professor, Instituto Tecnológico de Querétaro, México.

- Rafael Orive Illera, Ph.D. from both institutions the University of Chile, and Universidad Autónoma de Madrid (2003) Associate Professor, Universidad Autónoma de Madrid; joint papers : [58], [70], [98], [114].

- Luis Friz Roa, Ph.D. in Mathematical Modelling by the University of Chile (2003), Assistant Professor, The University of the Bío-Bío, Chillán; joint papers : [69], [74], [76].

- Eduardo Cerpa Jeria, Mathematical Engineering Diploma (2004).

- Rodrigo Lecaros Lira, Mathematical Engineering Diploma (2005); joint papers : [75], [111].

- Patricio Cumsille Atala, Ph.D. in Mathematical Modelling by the University of Chile (2006); joint papers : [77], [79], [117].

- Mihaela Loredana Smaranda, Ph.D. from both institutions the University of Chile and Universitatea din Pitęsti, Romania (2006); joint papers : [78], [82], [118].

- Felipe Macías Araya, Mathematical Engineering Diploma (2007); joint papers : [111].

- León Sanz Bunster, Mathematical Engineering Diploma (2008); joint papers : [80], [81], [115], [116].

- Manuel Larenas Aravena, Mathematical Engineering Diploma (2010).

- Patricio Cerda Reyes, Diploma de Ingeniero Civil en Biotecnología (2010).

- Cristóbal Quiñinao Montero, Mathematical Engineering Diploma (2010).

- Erica Schwindt Malacarne, Ph.D. by both institutions the University of Chile and the University Henri Poincaré, Nancy I (2011); joint papers : [90].

- Francisco Unda Surawski, Mathematical Engineering Diploma (2012).

- Emilio Vilches Canales, Mathematical Engineering Diploma (2012).

- Rodrigo Lecaros Lira, Ph.D. in Mathematical Modelling, University of Chile (2012).

- Benjamín Obando Vallejos, Mathematical Engineering Diploma (2013).

- Karina Vilches Ponce, Ph.D. by both institutions the University of Chile and the University Pierre et Marie Curie, Paris VI (2014); joint papers : [87], [92].

- Paul Acevedo Tapia, Ph.D. by both institutions the University of Chile and the University of Pau et des Pays de l'Adour (2015); joint papers : [97].

- Duver Quintero Castañeda, Ph.D. by both institutions the University of Chile and the University of Pau et des Pays de l'Adour (2016); joint papers : [98].

- Hugo Carrillo Lincopi, Mathematical Engineering Diploma (2016).

- Matías Godoy Campbell, Ph.D. by both institutions the University of Chile and the University of Toulouse III Paul Sabatier (2016); joint papers : [100].

- Viviana Solano Palma, Ph.D. in Mathematical Modelling, University of Chile (2017).

- David Medina, BioInformatics Engineering Diploma (2017), University of Talca, Chile.

- Donato Vásquez-Varas, Ph.D. by both institutions the University of Chile and the University of Sevilla (2022); joint papers : [113], [114], [115].

- Vicente Ocqueteau Canales, Master in Applied Mathematics and Mathematical Engineering Diploma (2023), joint papers : [119].

- Rodrigo Zelada Mancini, Ph.D. by both institutions the University of Chile and the University of Pau et des Pays de l'Adour (2025); joint papers : [174].

• *Post-docs*:

- Natalia Jiménez Tapia (Assistant Professor, Institute of Biological and Medical Engineering, Schools of Engineering, Medicine and Biological Sciences, Pontifical Catholic University of Chile, Santiago, Chile)

- Matías Godoy Campbell (Assistant Professor, Faculty of Engineering, Architecture and Design, Universidad San Sebastián, Santiago, Chile)

- Indira Mishra (Assistant Professor, Indian Institute of Science Education Research Bhopal, Bhopal, India)

- Eduardo Elio Espejo Arenas (Assistant Professor, University of Nottingham Ningbo China – Ningbo School of Mathematical Science, China)

- Muslim Malik (Assistant Professor, Birla Institute of Technology and Science, Pilani - Goa, India)

- Patricio Cumsille Atala (Associate Professor, Universidad del Bío-Bío, Chillán, Chile)

- Mihaela Loredana Smaranda (Full Professor, Universitatea din Pitęsti, Romania)

- Guillaume Legendre (Maître de Conférences, Université de Paris-Dauphine, Francia)

- Rajesh Mahadevan (Associate Professor, University of Concepción, Chile)

- Leonardo Baffico Haramoto (Maître de Conférences, Université de Caen, France)

- Olivier Titaud (Université Jean Monnet de Saint Etienne)

- Catalina Alvarez (Universidad de Chile)

- Claudia Timofte (Associate Professor, University of Bucarest, Romania)

- Delphine Dupuy (Enseignante, Ecole Nationale des Mines de Saint-Etienne, France)

- Fatima Zaouri (Institut Elie Cartan, Université de Nancy I, France)

- Srinivasan Natesan (Professor (HAG), Department of Mathematics, Indian Institute of Technology, Guwahati, India)

- Jaime Ortega Palma (Full Profesor, Department of Mathematical Engineering, University of Chile)

11.- Invited Lectures, Plenary Conferences at International Congresses

- 1^{st} Conference on Large-Scale Computations in Fluid Mechanics, San Diego (U.S.A.), July 1983.
- 1^{st} U.S.A.-Chile International Conference in Nonlinear Analysis and Differential Equations, Santiago (Chile), April 1985.
- Annual National Meeting of the Chilean Mathematical Society, Valparaíso (Chile), October 1985.
- 1^{st} World Congress on Computational Mechanics, Austin (U.S.A.), September 1986.
- 5^{th} Chilean Regional Conference on Mathematics, Temuco (Chile), September 1989.
- 2^{nd} France-Chile & Latinoamerican Conference on Applied Mathematics, Santiago (Chile), December 1989.
- 3^{rd} National Meeting on Nonlinear Analysis and Applications, Concepción (Chile), January 1991.
- Summer School on Recent Advances on Partial Differential Equations held at the Complutense University of Madrid, El Escorial (Spain), July 1992.
- International Congress on Numerical Methods in Engineering and Applied Sciences, Concepción (Chile), November 1992.
- Comca'93, Antofagasta (Chile), August 1993.

- First School of Applications of Mathematics to Industry, Santiago (Chile), January 1994.
- 4^{th} France-Chile & Latinoamerican Conference on Applied Mathematics, Concepción (Chile), December 1995.
- LXVIII Anual Meeting of the Chilean Mathematical Society, Valparaíso (Chile), October 1996.
- Itla 97, II Italian-Latinoamerican Conference on Applied and Industrial Mathematics, Rome, January 1997.
- CANum'97, 29^{th} French National Congress on Numerical Analysis, Domaine d'Imbours à Larnas en Ardèche (France), May 1997.
- Comca'97, Congreso de Matemática Capricornio, Antofagasta (Chile), July 1997.
- Colloque Latin sur les Equations aux Dérivées Partielles, Versailles, June 1998.
- 4^{th} Wccm, Fourth World Congress on Computational Mechanics, Buenos Aires, June 1998.
- XXI Cnmac, 21^{th} Brazilian National Congres on Applied and Computational Mathematics, Caxambu, September 1998.
- V^{th} Chilean Mathematical Symposium, Olmué, October 1998.
- Summer School of Applied Mathematics and Modelling, Primcas 99 (Program on Mathematics Engineering and Scientific Computation), Quito, July 1999.
- Comca 99, Congreso de Matemática Capricornio, Antofagasta (Chile), August 1999.
- 51^{st} Brazilian Seminar of Mathematical Analysis, Florianópolis, May 2000.
- Anasthem I, 1^{st} International Congress on Asymptotic and Numerical Analysis of Structures and of Heterogeneous Media, St. Petersburg, July 2000.
- 1^{st} Latin American Congress of Mathematicians, Impa, Rio de Janeiro, August 2000.
- Homogenization and Applications to Material Sciences: An International Conference organized by the University of West Timisoara, Timisoara (Roumania), September 2001.
- XVII Cedya & VII Cma, XVII National Spanish Congress on Differential Equations and Applications & VII Congress on Applied Mathematics, Salamanca (Spain), September 2001.
- 6^{th} France-Chile & Latinoamerican Conference on Applied Mathematics, Santiago (Chile), December 2001.
- Pan-American Advanced Studies Institute, Pasi on Partial Differential Equations, Santiago, January 2003.
- Wonapde 2004, First Chilean Workshop on Numerical Analysis for Partial Differential Equations, Concepción (Chile), January 2004.
- Summer School on Homogenization and Shape Optimization, Lisboa (Portugal), September 2004.
- Une Journée à Versailles autour des Equations aux Dérivées Partielles Nonlinéaires (honoring Fulbert Mignot), Paris (France), January 2005.
- Comca 2005, Congreso de Matemática Capricornio, Antofagasta (Chile), August 2005.
- Efemin 2005, V Encuentro de Modelos Físicos y Matemáticos en Ingeniería, Santiago (Chile), November 2005.
- Cimpa School - Propagation of Waves, Cuernavaca (Mexico), January 2006.
- A.P. Calderón Seminar on Inverse Problems and Applications, Rio de Janeiro (Brazil), September 2006. (www.lncc.br/calderon)
- III^{rd} International Seminar of Applications of Mathematics, Lima (Perú), August 2006. (www.ur.pedu.pe)
- XVI National Congress of Mathematics, Medellín (Colombia), July 16-19, 2007. (www.scm.org.co/index.php?hoja=Congreso2007)
- WIMA 2007, Ibero-American Workshop on Applied Mathematics, Chillán, Región del Bío-Bío (Chile), August 6-8, 2007.
- CANum'08, 39^{th} French National Congress on Numerical Analysis, Saint Jean de Monts, Vendée (France), May 26-30, 2008. (smai.emath.fr/canum2008)
- Non-classical, boundary and localization phenomena in mathematical homogenisation, Cardiff, August 26-30, 2008. (www.cardiff.ac.uk/maths/subsites/pde2008)
- Current and New trends in Scientific Computing, Santiago de Chile, October 5-6, 2009. (cntsc2009.cmm.uchile.cl)

- International Workshop, Control and Inverse Problems Bangalore (India), December 01-15, 2009. (math.iisc.ernet.in/ imi)
- International Conference, Control and Inverse Problems Bangalore (India), December 16-18, 2009. (math.iisc.ernet.in/ imi)
- WSA2010 : Workshop on Advances in Topological Sensitivity Analysis for Computational Modeling, Petrópolis (Brazil), August 2-6, 2010 (lncc.br/wsa2010/app/home)
- X DIM-CMM Spring School, Santiago, from September 17 to October 8, 2010. (escuela_primavera.cmm.uchile.cl/)
- XXIV Mathematical Meeting from the Southern Chilean Zone, Pucón (Chile), April 27-29, 2011. (sites.google.com/a/u.uchile.cl/geed-mat/congresos/jornadazonasur)
- Nonlinear Models in Partial Differential Equations, Toledo (España), June 14-17, 2011. (www.mat.ucm.es/homenajeJIDiaz60/)
- Inaugural Conference, Facultad de Ciencias Exactas, Universidad Andrés Bello, Santiago, June 29, 2011.
- 10^{nt} Workshop on Computational Mechanics, Santiago, PUC, October 13-14, 2011. (web.ing.puc.cl/ jmc2011/)
- V Workshop on Functional Analysis and Evolution Equations, Santiago, USACH, 23-25 de Octubre, 2010. (gafevol.usach.cl/pagweb8.html)
- LXXX Anual SOMACHI Conference, Termas del Corazón (Chile), November 3-5, 2011. (encuentro2011.somachi.cl/descripcion.html)
- VI Workshop on Functional Analysis and Evolution Equations, Santiago, USACH, November 15-17, 2011. (gafevol.usach.cl/pagweb8.html)
- XI DIM-CMM Summer School, Santiago, January 9-20, 2012. (xi_escuela_verano.cmm.uchile.cl/)