

# CURRICULUM VITAE

DUNG LE

September 2014

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## PERSONAL

Address: 10978 Cedar Park, San Antonio, TX 78249.  
Visa status: US citizen.  
Marital status: married, two children.

## EDUCATION

**1994-1997** Ph. D., mathematics, Arizona State University, USA.  
Advisors: Profs. Hank Kuiper, Basil Nicolaenko and Hal L. Smith.  
**1992-1993** Diploma, mathematics, ICTP, Trieste, Italy.  
Advisor: Prof. Alberto Verjovsky.  
**1981-1986** B. Sc., mathematics (highest honor), University of Saigon, HCM City, VN.

## RESEARCH INTERESTS:

Partial differential equations; nonlinear analysis; regularity theory of weak solutions; applications of PDEs; mathematical biology; mathematical physics; dynamical systems.

## EMPLOYMENT:

**2009-present** Professor, University of Texas at San Antonio.  
**2003-2009** Associate Professor, University of Texas at San Antonio.  
**1999-2003** Assistant Professor, University of Texas at San Antonio.  
**1997-1999** Postdoctoral Fellow, Georgia Institute of Technology, USA. Postgraduate advisor: Prof. Jack K. Hale.  
**1994-1997** Teaching and research assistant, Arizona State University, USA.  
**1993-1994** Software project manager, T&C Company, VN.  
**1992-1993** Diploma candidate, International Center for Theoretical Physics, Trieste, Italy.  
**1987-1992** Engineer, CINOTEC company and Research Laboratory, VN.  
**1986-1987** Living on the streets of Saigon.

## PROFESSIONAL ACTIVITIES:

1. Managing co-editor for the Electronic Journal of Differential Equations.
2. Referee for the professional mathematical journals and reviewer for AMS review.
3. Member of SIAM, AMS, MAA.

## GRANTS:

1. *Long-time Dynamics and Regularity Properties of Strongly Coupled Parabolic Systems*. NSF Applied Mathematics program. Grant number DMS0305219 from 05/2003-09/2005.
2. *Higher dimension cross diffusion systems*. NSF Analysis program. Grant number DMS0707229 from 06/2007-05/2011.

## PUBLICATIONS (peer reviewed):

1. (With D. M. Duc) *Compactness of the imbeddings of Sobolev spaces*, J.London.Math.Soc(2)40(1989) 105-119.
2. *Boundary  $C^{1,\alpha}$  regularity of singular semilinear elliptic equations*, Nonlinear Analysis T.M.A. 1996 vol 2 no. 1, pp. 67-80.
3. (with Hal L. Smith) *A parabolic system modelling microbial competition in un-mixed bioreactor*. Journal of Differential equations, vol 130, no. 1 (1996) pp. 59-91.
4. *On a class of singular quasilinear elliptic equations with general structure and distribution data*. Nonlinear Analysis T.M.A. 1997 vol. 28 no. 11 pp. 1879-1902.
5. *Dissipativity and global attractors for a class of quasilinear parabolic systems*. Communications in P.D.E, 1997, vol. 28, No. 11, pp. 1879-1902.
6. *On Steady state solutions of a class of reaction diffusion systems*. Third G. Butler memorial conference, Canadian Applied Math. Quarterly Vol. 6, No. 1, Winter 1997.
7. *Global  $L^\infty$  estimates for a class of reaction diffusion systems*. ( J. Mathematical Analysis and Application, 217(1998) pp. 72-94)
8. *Global attractors and steady states for a class of reaction diffusion systems* J. Differential equations, Vol. 147, pp. 1–29, 1998.
9. (with M. Ballyk, D. Jones and H. Smith) *Effects of random motility on microbial growth and competition in a Flow reactor*. SIAM Applied Math. 1999, pages 573–596, Vol. 59, No. 2, 1998.
10. (with Hal Smith and Paul Waltman) *Growth in the unstirred chemostat with different diffusion rates*. Halifax conference proceedings, Fields Inst. Communications, pages 131–142, 21, 1999.
11. *Hölder regularity for certain strongly coupled parabolic systems*. J. Diff. Eqns. Vol. 151, pp 313–344,(1999).
12. (with Hal Smith) *Steady states of models of microbial growth and competition with chemotaxis*. J. Math. Anal. Appl. pages 295–318, 229, 1999.
13. *Ultimate boundedness of solutions and gradients of a class of degenerate parabolic systems*. Nonlin. Anal. TMA, vol. 39, pp.157–171, (2000).
14. *Remark on Hölder continuity for parabolic equations and the convergence to global attractors*. Nonlinear Analysis T.M.A., Vol. 41, pp. 921–941 (2000).
15. *Coexistence with chemotaxis*. SIAM J. Math. Analysis., Vol. 32, No. 3, pp. 504–521, (2000).
16. (with B. Nicolaenko) *Exponential attractors in Banach spaces* Journal of Dynamics and Differential Equations; Vol. 13, No. 4, pp. 791–806, Oct 2001.
17. (with Don Jones, Hristo Kojouharov, H.L. Smith) *Microbial Competition in a 3–D Flow Reactor* Conference proceedings for International Conf. on Dynamics of Continuous, Discrete and Impulsive Systems.
18. *Cross Diffusion Systems on  $n$  spatial dimensional domains*. Indiana Univ. Math. J.; Vol. 51, No. 3, pp.625–643, 2002.
19. (with Don Jones, Hristo Kojouharov, H.L. Smith) *Bacterial wall attachment in a flow reactor*, SIAM J. Applied Math., Vol. 62, No. 5, pp. 1728–1771, 2002.
20. *On a time dependent bio-reactor model with chemotaxis*, J. Appl. and Comp. Math., Vol. 131, pp. 531–558, 2002.
21. *Dynamics of a bio-reactor model with chemotaxis*. J. Math. Anal. Appl. 275 (2002), no. 1, 188–207.

22. (with Smith, Hal) *Strong positivity of solutions to parabolic and elliptic equations on nonsmooth domains*. J. Math. Anal. Appl. 275 (2002), no. 1, 208–221.
23. (with Jones, Don; Kojouharov, Hristo V.; Smith, Hal) *Bacterial wall attachment in a flow reactor: mixed culture*. Canadian Appl. Math. Quart. 10 (2002), no.1, 111–137.
24. (with Don Jones, Hristo Kojouharov, H.L. Smith) *Microbial Competition for Nutrient in a 3-D Flow Reactor*. Dynamics of Continuous, Discrete and Impulsive Systems. Ser. B Appl. Algorithms 10 (2003), no. 1-3, 57–67.
25. *Cross diffusion systems on  $n$  spatial dimensional domains*. Proceedings of the Fifth Mississippi State Conference on Differential Equations and Computational Simulations, 193–210 (electronic), EJDE 10 (2003).
26. (with Nguyen, Linh Viet; Nguyen, Toan Trong) *Shigesada-Kawasaki-Teramoto model on higher dimensional domains*. E.J. Differential Equations 2003, No. 72.
27. *Exponential attractors for a chemotaxis growth system on domains of arbitrary dimension*. Proceeding of the 4th AIMS meeting 2002 Wilmington. Dyn.Sys.Diff.Eqn (2003), pp. 536-543.
28. (with Don Jones, Hristo Kojouharov, H.L. Smith) *The Freter model: a simple model of biofilm formation*. J. Math. Biology vol. 47, no. 2(2003) pp. 137-152.
29. *Global existence for a Class of Strongly Coupled Parabolic Systems*. Annali di Matematica Pura ed Applicata 185 (2005), pp. 133-154.
30. (with Toan Nguyen) *Global Existence for a Class of Triangular Parabolic Systems on Domains of Arbitrary Dimension*. Proceedings AMS 133(2005), pp. 1985-1992.
31. *Regularity of solutions to a class of cross diffusion systems*. SIAM Mathematical Analysis 38 no.6 (2005), pp. 1929-1942.
32. (with Hank Kuiper) *Global Attractors for Cross Diffusion Systems on Domains of Arbitrary Dimension*. Rocky Mountain J. Math Vol. 37, No. 5, 2007, pp. 1645–1668.
33. *Partial regularity for Strongly Coupled Degenerate Parabolic systems*. Discrete and Continuous Dynamical Systems, suppl volume 2005, pp.576-586.
34. (with Toan Nguyen) *Everywhere regularity for degenerate cross diffusion systems*. Communications in PDEs, 31 no 2(2006) pp. 307-324.
35. (with Toan Nguyen) *Persistence for a class of Triangular Cross diffusion Parabolic systems*. Advanced Nonlinear Studies 5(2005), pp.509-530.
36. (with Toan Nguyen) *Global attractors and uniform persistence for cross diffusion systems*. Dynamical Systems and Applications. Vol 16, No. 2, 2007, pp. 361-378.
37. (with Linh Nguyen and Toan Nguyen) *Coexistence in Cross Diffusion systems*. Indiana Univ. J. Math. Vol.56, No. 4, pp.1749-1791, 2007.
38. *Higher integrability for gradients of solutions to degenerate parabolic systems*. Discrete Contin. Dyn. Syst. 26 (2010), no. 2, 597–608.
39. *Regularity of BMO weak solutions to nonlinear parabolic systems via homotopy*. Trans. Amer. Math. Soc. 365 (2013), no. 5, 2723–2753.
40. *Global existence results for near triangular nonlinear parabolic systems*. Adv. Nonlinear Stud. 13 (2013), no. 4, 933-944.
41. *Regularity for fully nonlinear  $p$ -Laplacian parabolic systems: the degenerate case*. Adv. Nonlinear Stud. 14 (2014), no. 1, 199-237.
42. *Strong positivity of solutions to parabolic equations on domains with rough boundary data*. Discrete Contin. Dyn. Syst. 35 (2015), no. 4, 1521–1530

43. (with Vu Nguyen) *Global solutions to Cross Diffusion Parabolic Systems on 2D Domains*. Proc. Amer. Math. Soc. 143 (2015), no. 7, 2999–3010.
44. (with Shair Ahmad) *Global and Blow Up Solutions to Cross Diffusion Systems*. Adv. Nonlinear Anal. 4 (2015), no. 3, 209–219.
45. *On the Regular Set of BMO Weak Solutions to  $p$ -Laplacian Strongly Coupled Nonregular Elliptic Systems*. Discrete Contin. Dyn. Syst. Ser. B 19 (2014), no. 10, 3245–3265.
46. (with Shair Ahmad) *Global and blow up solutions to cross diffusion systems*. Adv. Nonlinear Anal. 4 (2015), no. 3, 209–219.
47. (with Vu Nguyen) *Global and blow up solutions to cross diffusion systems on 3D domains*. Proc. Amer. Math. Soc. 144 (2016), no. 11, 4845–4859.
48. *Weighted Gagliardo-Nirenberg inequalities involving BMO norms and solvability of strongly coupled parabolic systems*. Adv. Nonlinear Stud. 16 (2016), no. 1, 125–146.
49. *Existence of strong and nontrivial solutions to strongly coupled elliptic systems*. J. Funct. Anal. 272 (2017), no. 11, 4407–4459.
50. *Global existence and regularity results for strongly coupled nonregular parabolic systems via iterative methods*. Discrete Contin. Dyn. Syst. Ser. B 22 (2017), no. 3, 877–893.
51. *Local and global existence of strong solutions to large cross diffusion systems*. Adv. Nonlinear Stud. 18 (2018), no. 1, 151–167.
52. *Strongly coupled parabolic and elliptic systems. Existence and regularity of strong and weak solutions*. De Gruyter Series in Nonlinear Analysis and Applications, 28. De Gruyter, Berlin, 2019. x+184 pp. ISBN: 978-3-11-060715-4.
53. *Global existence for some cross diffusion systems with equal cross diffusion/reaction rates*. Adv. Nonlinear Stud. 20 (2020), no.4, 833–845
54. (with Shair Ahmad) *Existence of attractors when diffusion and reaction have polynomial growth*. Rend. Istit. Mat. Univ. Trieste 52(2020), 267–287
55. *Uniqueness and regularity of unbounded weak solutions to a class of cross diffusion systems*. NoDEA. 28(2021), no. 3, 25 pp.
56. *On the global existence of a generalized Shigesada-Kawasaki-Teramoto system* J. Math. Anal. App. (2022), (in press)
57. *On the continuity of bounded weak solutions to parabolic equations and systems with quadratic growth in gradients*. Vietnam. Acta Math. (accepted)

## PREPRINTS and WORKS in PROGRESS

1. (with Vu Nguyen) *On global existence and blow up solutions of cross diffusion systems on 3D domains*, submitted preprint.
2. *Interpolation Gagliardo-Nirenberg inequalities and classical solutions to strongly parabolic large systems via iterative methods*. In progress.
3. *Exponential attractors for cross diffusion systems*, preprint.
4. *Global Existence and Regularity Results for Large Cross Diffusion Models on Planar Domains*. arXiv:1605.00043
5. *Global Existence and Global Attractors of Cross Diffusion Systems on Planar Domains*. arXiv:1605.05014
6. *Uniqueness and Regularity of Unbounded Weak Solutions to a Class of Cross Diffusion Systems*. arXiv:1906.03456

7. Existence and Uniqueness of Weak Solutions to a Class of Degenerate Cross Diffusion Systems. arXiv:1909.05087
8. Global Existence for some Cross Diffusion Systems with Equal Cross Diffusion/Reaction Rates. arXiv:1910.07260.
9. On the positivity of strong solutions via duality method (almost complete).
10. Invariance principles for strongly coupled systems (in development).

## REPORTS and UNPUBLISHED WORKS

1. *On the strongly singular linear elliptic equations.* preprint ICTP 1992 IC/92/401.
2. *On the least energy critical set.* preprint ICTP 1992 IC/92/363.
3. *A summary on the methods of regularity theory for quasilinear elliptic equations and some contributions to the singular cases.* Dissertation for ICTP Diploma course in Mathematics 1992-1993.
4. *Nonlinear Parabolic Systems and Attractors.* Ph. D. dissertation, Aug. 1997 Arizona State University.
5. *Coexistence in Chemotaxis-General results.* CDSNS98-306 report.
6. *Coexistence in Chemotaxis-The periodic case.* CDSNS98-307 report.
7. *On reverse Jensen inequalities in weighted spaces.* 2011
8. *Reverse Jensen inequalities in homogeneous type spaces.* 2012.

## CONFERENCES and TALKS

1. **Workshop on Fluid mechanics** January 1989, International Center for Theoretical Physics (ICTP) Trieste Italy.
2. **Diploma course in Mathematics** 1992-1993, International Center for Theoretical Physics. Trieste, Italy.
3. **Summer course in P. D. E.** June 1993, University of Padova, Padova Italy.
4. **Volterra centennial conference** May 1996 Arizona State Univeristy, USA. Talk: Microbial competition in un-mixed Bio-reactor.
5. *Competition in Chemostats.* Sept. 1995 Dept. of Math. Arizona State Univ.
6. *On a nonlinear diffusion system.* Feb. 1996 Dept. of Math. Arizona State Univ.
7. *Global attractors and steady states of a class of parabolic systems.* Oct. 1996 Dept. of Math. Arizona State Univ.
8. *Exponential attractors in Banach spaces.* Oct. 1996 Dept. of Math. Arizona State Univ.
9. **Workshop on teaching** Aug 1996, Arizona State University.
10. **Third G. Butler memorial conference** June 1996, University of Alberta, Alberta Canada. Talk: Global attractor for reaction diffusion systems.
11. **SouthWest Conference** May 1997, University of North Texas, USA. Talk: Exponential attractors in Banach spaces.
12. **AMS SouthEastern Conference** Oct 1997, Georgia Inst. of Technology.
13. *Nonlinear parabolic systems and attractors.* Mar. 1997, Georgia Inst. of Technology, School of Mathematics.

14. *Hölder regularity for nondegenerate and degenerate quasilinear parabolic equations.* Oct 1997, Georgia Inst. of Technology.
15. *Regularity for certain strongly coupled quasilinear parabolic systems.* Oct 1997, Georgia Inst. of Technology.
16. *On steady states of Chemotaxis* Feb. 1998, Emory University.
17. *Coexistence with Chemotaxis* Oct 1998, Georgia Inst. of Technology.
18. *Periodic solutions and coexistence with Chemotaxis* March 1999, UT of San Antonio.
19. *Dynamics in a Chemotaxis models* Sept 1999, UT of San Antonio.
20. **Third Americas Conference** Sept 1998, Georgia Inst. of Technology. Talk: Coexistence with Chemotaxis.
21. **Nonlinear Differential Equations** Jan 1999, University of Miami. Talk: Periodic solutions in Bioreactors with chemotaxis.
22. *On a cross diffusion system* April 2000, Biological Math. seminar, Ariz. State Univ.
23. *Cross diffusion models* March 2000, UTSA.
24. *Coexistence with Chemotaxis* October 2000, UTSA.
25. **Third World Congress of Nonlinear Analysts (WCNA-2000)** July, 2000 Catania, Italy. Invited talk.
26. **International Conference for Applied Mathematics and Engineering (CIMASI'2000)** Oct 2000 Casablanca, Marocco. Member of the Scientific Committee.
27. **AMS meeting** Jan 2000 Washington DC. Invited talk.
28. **Texas PDE** March 2000 Austin.
29. *Regularity for cross diffusion systems* March 2001, UTSA.
30. *Recent results in regularity theory for cross diffusion systems* September 2001, UTSA.
31. **Texas PDE** March 2001 Houston.
32. **SIAM Workshop** April 2001 Houston.
33. **Fifth Mississippi State Conference on DE and CS** May 2001, Mississippi State University.
34. **International Conference on Dynamics of Continuous, Discrete and Impulsive Systems** London, Ontario, Canada July 27-31, 2001 . Invited talk.
35. **Using Spectral Data to Solve Inverse Problems** NSF/CBMS conference, December 2001 Texas PanAm Univ.
36. **4th International Conference on Dynamical systems and Differential equations**, May 2002 Wilmington, NC. Invited talk.
37. **Differential Equations and Nonlinear Dynamics**, July 07-12, 2002 University of Alberta, Canada. Invited talk.
38. **International Conference for Applied Mathematics and Engineering (CIMASI'2000)** Oct 2002 Casablanca, Marocco. Member of the Scientific Committee.
39. **Everything Disperses to Miami: The Role of Movement and Dispersal in Ecology, Epidemiology and Environmental Science.** Univeristy of Miami, FL, December, 2012.
40. **Invited talks at the AIMS International Conferences** California, Texas, Florida, Germany, Spain since 2002-2014.

41. **Colloquium.** Univeristy of Miami, FL, March, 2009.
42. **Applied Math Seminars - Texas Tech.** April 2009
43. **Everything Disperses to Miami: The Role of Movement and Dispersal in Ecology, Epidemiology and Environmental Science.** Univeristy of Miami, FL, December, 2012.
44. **AMS Sectional meeting at Texas Tech University,** Lubbock, TX April, 2014.
45. **Analysis Seminar - Ecole Polytechnique Federale de Lausanne,** Switzerland July 2014.
- d.1) I was awarded a semester developmental leave in the Spring 2018 to finish the book a.1).
- d.2) In preparing the works a.4) and a.6) I was invited to give two talks in the summer 2016 at the International meetings of AIMS (American Institute of Mathematical Society) in Madrids, Spain.
- d.3) I was invited to give a talk in Summer 2018 at the Mathematics department of The University of Lausanne, Switzerland.
- d.4) I was invited to give a talk in the summer 2018 at the International meetings of AIMS (American Institute of Mathematical Society) in San Diego, USA.
- d.5) In Spring 2017, I was invited to give a colloquium talk at the department of Mathematics of Universidade Federal do Rio de Janeiro, Brasil.
- d.6) I was one of the keynote speaker of the Regional Big Bend Texas A&M meeting in 20020. This meeting was canceled due to virus Covid-19.

## SOFTWARE

1. **CHEMO** A Java program with friendly graphics interface to simulate Diffusion-Reaction and Cross-Diffusion systems. Posted at [www.math.utsa.edu/~dle](http://www.math.utsa.edu/~dle).

## COMPUTER and LANGUAGE SKILLS

Good knowledge of C and Java languages (4 years experience), database, Windows. Expertise in using Maple, Matlab and Mathematica for teaching demonstration. Vietnamese: native tongue; English: fluent; French and Russian: good reading.

## UTSA SERVICE

1. Graduate Studies committee, CFRAC, Chair Search committee, Hiring committee.
2. Applied Mathematics PhD Committee (2000-2004).
3. Recruitment and tutor appointment for Math Tutoring Lab (2000-2001 and 2003-2004).
4. Graduate Advisor of Record (2001-2002, 2003-2005, 2008-2012)
5. TA Supervisor (2002-2003,2005-2007)
6. Undergraduate Honors Thesis Committee and Advisor:
  - (a) Danielle Lyles, *Modeling follicular development in the menstrual cycle and IVF*, 2000, UTSA. Chair: MaryLou Zeeman.
  - (b) Jenifer Freeman, *Coexistence in bio-reactors*, 2013, UTSA. Chair.
7. Student Service: Advisor for VSA (Vietnamese Student Association at UTSA) since 1999.
8. Master thesis supervisor:
 

Linh Nguyen (currently, associate professor at University of Idaho),

Toan Nguyen (currently, associate professor at Penn State),  
Duc Luu (Ph.D and lecturer at National University of Singapore),  
Kha Minh (Postdoc Universty of Arizona),  
Khoa Le (Postdoc at University of Alberta).