AURELIO ASUG DE LOS REYES V

CURRICULUM VITAE

Institute of Mathematics
University of the Philippines Diliman
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PERSONAL DATA

Date of Birth: 21 December 1980
Place of Birth: Magarao, Camarines Sur, Philippines
Nationality: Filipino

EDUCATION

2007 - 2010: **Dr. rer. nat., Mathematics**
mit Auszeichnung bestanden (pass with distinction)
Karl-Franzens Universität Graz, Austria
(viva: 21 April 2010)

2001 - 2004: **M.S., Mathematics**
University of the Philippines Baguio, Philippines
(date graduated: 23 April 2004)

1997 - 2000: **B.S., Mathematics**
University of the Philippines Baguio, Philippines
(date graduated: 02 November 2000)

SCHOLARSHIP AWARDS

Feb. 2007 – Jan. 2010: **Technologiestipendien Südostasien (Doktorat),**
ÖAD Scholar, Austria

June 2002 – May 2004: **Commission on Higher Education (CHED)**
Faculty Development Project Scholar, Philippines

June 1997 – Nov. 2000: **Department of Science and Technology**
(DOST) Scholar, Philippines

WORK EXPERIENCE

June 2010 - present:	**Assistant Professor 4** Institute of Mathematics College of Science, University of the Philippines Diliman
Jan. 2014 - May 2014:	**Postdoc Researcher** Renal Research Institute New York
Jan. 2013 - Dec. 2013:	**Postdoc Researcher** Department of Mathematics Konkuk University, Republic of Korea
Nov. 2011 - Oct. 2012:	**Postdoc Researcher** Biozentrum University of Basel, Switzerland
Nov. 2010 - Oct. 2011:	**Postdoc Researcher** Institute of Molecular Life Sciences University of Zurich, Switzerland
July 2005 - Oct. 2006:	**Assistant Professor 1** Department of Mathematics and Computer Science College of Science, University of the Philippines Baguio
June 2002 - June 2005:	**Instructor 1** Department of Mathematics and Computer Science College of Science, University of the Philippines Baguio

PUBLICATIONS

Journal Articles

7. Jung, E., **de los Reyes V, A.A.**, Pumares, K.J.A., and Kim, Y, *Strategies in regulating glioblastoma signaling pathways and anti-invasion therapy*, *in revision*

6. **de los Reyes V, A.A.** and Escaner IV, J. L. *Dengue in the Philippines: model and analysis of parameters affecting transmission*, Journal of Biological Dynamics, (2018) 12(1): 894-912. doi: 10.1080/17513758.2018.1535096

5. Soyoung, K., **de los Reyes V, A.A.**, and Jung, E. *Mathematical model and intervention strategies for mitigating tuberculosis in the Philippines*, Journal of Theoretical Biology, (2018) 443: 100-112. doi: 10.1016/j.jtbi.2018.01.026

4. Calderon, P.G.B., Habib, M., Kappel, F. and **de los Reyes V, A.A.** *Control aspects of the human cardiovascular-respiratory system under a nonconstant workload*, Mathematical Biosciences, (2017) 289: 142-152. doi: 10.1016/j.mbs.2017.05.008

3. **de los Reyes V, A.A.**, Fuertinger, D. H., Kappel, F., Meyring-Wösten, A., Thijssen, S. and Kotanko, P. *A physiologically based model of vascular refilling during ultrafiltration in hemodialysis*, Journal of Theoretical Biology, (2016) 390: 146-155. doi: 10.1016/j.jtbi.2015.11.012

2. **de los Reyes V, A.A.**, Jung, E., and Kim, Y. *Optimal strategies of eradicating glioblastoma cells after conventional surgery*, Journal of Royal Society Interface, (2015) 12(106), pii: 20141392. doi: 10.1098/rsif.2014.1392

1. **de los Reyes V, A.A.**, Jung, E. and Kappel, F. *Stabilizing control for a pulsatile cardiovascular mathematical model*, Bulletin of Mathematical Biology, (2014) 76(6):1306-1332, doi: 10.1007/s11538-014-9958-2

Patent

WO application 2015184287, **de los Reyes V, A.A.**, Fuertinger, D. H., Kappel, F., Meyring-Wösten, A., Thijssen, S. and Kotanko, P. *System for analyzing vascular refill during short-pulse ultrafiltration in hemodialysis*, published 3 December 2015, assigned to Fresenius Medical Care Holdings, Inc.

Other Article

de los Reyes V, A.A., *Dynamics of a Cardiovascular Model Obtaining Measurable Pulsatile Pressure Output*, World Journal of Modelling and Simulation, (2015) 11(1):20-32

Conference Proceedings

3. **de los Reyes V, A.A.**, Fuertinger, D. H., Kappel, F., Meyring-Wösten, A., Thijssen, S. and Kotanko, P. *Mathematical Model Providing New Insights into Vascular Refilling During Dialysis*, J Am Soc Nephrol 25, 2014: 294A

2. Schättler, H., Ledzewicz, U., Kim, Y., **de los Reyes, A.** and Jung, E. *On the Control of Cell Migration and Proliferation in Glioblastoma*, In: Proceedings of the 52nd IEEE Conference on Decision and Control, Florence, Italy, December 2013, pp. 1810-1815, doi:10.1109/CDC.2013.6760145

1. **de los Reyes V, A.A.** and Kappel, F. *Modeling Pulsatility in the Human Cardiovascular System*, Mathematica Balkanica, New Series Vol. 24, 2010, Fasc. 3-4, 229-242

Technical Report

de los Reyes V, A.A. and Kappel, F. *A Mathematical Cardiovascular Model with Pulsatile and Non-Pulsatile Components*, SFB-Report No. 2010-011, March 2010, Institute for Mathematics and Scientific Computing, University of Graz, Austria

PhD Thesis

de los Reyes V, A.A., *A Mathematical Model for the Cardiovascular System with a Measurable Pulsatile Pressure Output*, PhD Thesis, submitted March 2010, Institute for Mathematics and Scientific Computing, University of Graz, Austria

Manuscripts in Preparation

2. Alota, C., Arceo, C.P., and **de los Reyes V, A.A.**, *An Edged-Based SEIR Dynaics on a Static Random Network with Arbitrary Degree Distributions*

1. P.G. B. Calderon, L. V. Palma, F. Kappel and **A. de los Reyes V**, *Sensitivity Analysis of a Model of the Cardiovascular-Respiratory Model under Constant Workload*

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

1. *member*, **Society for Mathematical Biology (SMB)** 2009 - present
2. *member*, **European Society for Mathematical and Theoretical Biology (ESMTB)** 2008 - present
3. *member*, **Society for Industrial and Applied Mathematics (SIAM)** 2016 - present
4. *associate member*, **National Research Council of the Philippines (NRCP)** 2016 - present
5. *member*, **Mathematical Society of the Philippines**, 2006 - present

OTHER SCIENTIFIC AWARDS/TRAVEL GRANTS

- **University of the Philippines System International Publication Awards (4x)**
- **University of the Philippines Diliman Centennial Faculty Grant (2x):** January 2015 – December 2015 Cycle and January 2016 – December 2016 Cycle
- **FEBS YTF Grant** to attend the 5^{th} **International Course in Yeast Systems** Biology to be held in Gothenburg, Sweden, June 6–23, 2011
- **Landahl Travel Grant Award** to attend the **2010 Annual Meeting of the Society of the Mathematical Biology** held in Rio de Janeiro, Brazil on July 26-29, 2010
- participation to **2009 Joint Meeting of the Korean Mathematical Society and the American Mathematical Society**, Ewha Womans University, Seoul, Korea, December 16-20, 2009 - funded by the Institute for Mathematics and Scientific Computing through its NAWI-GASS doctoral program travel grant fund
- participation to **FEPS 2009**, Ljubljana, Slovenia, November 12-15, 2009 - funded by the Institute for Mathematics and Scientific Computing through its NAWI-GASS doctoral program travel grant fund
- participation to Young Researchers in Mathematics Workshop, **MICOM 2009**, Ohrid, Macedonia, September 16-20, 2009 - travel cost was financed by the Institute for Mathematics and Scientific Computing through its NAWI-GASS doctoral program fund; accommodation and food expenses are covered by the Tempus Project on "SEE doctoral studies in Mathematical Sciences"
- full support for attendance (including registration, travel, accommodation, food, etc.) to Bio-Math Summer School and Workshop 2008, **Stochastic Differential Equation Models with Applications to the Insulin-Glucose System and Neuronal Modeling**, Middelfart, Denmark, August 3-16, 2008 - funded by *Marie Curie Conference and Training Courses Program*
- full support for attendance (including registration, travel, accommodation, food, etc.) to Summer School and Workshop Graz 2007, **Biomedical Modeling and Cardiovascular - Respiratory Control: Theory and Practice**, Schloss Seggau, Leibnitz, Austria, July 22 - August 4, 2007 - funded by *Marie Curie Conference and Training Courses Program*

FUNDED RESEARCH PROJECTS

1. **Control Aspects of the Cardiovascular-Respiratory System**
   Role: Project leader
   Program: Emerging Inter-Disciplinary Research (EIDR) Program Cycle 6
   Funding Source: University of the Philippines System
   Duration: 13 August 2015 – 12 August 2017

2. **Modeling Vascular Refilling during Hemodialysis**
   Role: Researcher *(via consulting agreement)*
   Funding Source: Renal Research Institute New York
   Duration: January 2014 – present

3. **Optimal Control Strategies of Regulating the "Go or Grow" Dynamics of Glioblastoma Multiforme**
   Role: Project leader
   Program: Enhanced Creative Work and Research Grants
   Funding Source: University of the Philippines System
   Duration: 01 August 2016 – 31 January 2018

4. **Modeling Dengue Transmission in the Philippines**
   Role: Project leader
   Funding Source: National Research Council of the Philippines (NRCP)
   Duration: 16 April 2016 – 15 April 2017

WORKSHOP ORGANIZATION

- *(member, organizing committee)* **2019 International Workshop on Mathematical Biology (IWOMB 2019)**, Bohol Bee Farm, Panglao Island, Bohol, Philippines, January 6-10, 2019 (`https://iwomb.weebly.com`)
- *(over-all chair)* **2018 International Workshop on Mathematical Biology (IWOMB 2018)**, Costabella Tropical Beach Resort, Cebu, Philippines, January 7-10, 2018 (`http://mathbio2018.weebly.com`)

PRESENTATIONS/TALKS

International:

1. *(invited speaker)* ***Control of a Cardiovascular-Respiratory System Model, Sensitivity Analysis and Parameter Identification***, **(special session on Optimal control and differential games: Recent developments in theory and applications) The 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications**, National Taiwan University, Taipei, Taiwan, July 5 - July 9, 2018

2. *(invited speaker)* ***Controls of Cardiovascular-Respiratory System under Ergometric Workload***, **MBI Workshop 3: Control of Disease: Personalized Medicine across Heterogeneous Populations**, Mathematical Biosciences Institute, Columbus, Ohio, October 30-November 3, 2017

3. *(poster presentation)* ***Sensitivity Analysis of a Cardiovascular-Respiratory System Model under Constant Workload***, **2017 Annual Meeting of the Society for Mathematical Biology**, University of Utah, Salt Lake City, July 17-20, 2017

4. *(contributed talk - minisymposia)* ***Parameter Estimation and Uncertainty Analysis of a Vascular Refilling Model Using Hematocrit Data in Hemodialysis Treatment***, **SIAM Conference on the Life Sciences**, The Westin Boston Waterfront, Boston, Massachusetts, USA, July 11-14, 2016

5. *(poster presentation[1])* ***A Model of the Cardiovascular-Respiratory System and its Control in Response to Different Types of Ergometric Workload***, **2016 Annual Meeting of the Society for Mathematical Biology and European Conference for Mathematical and Theoretical Biology**, University of Nottingham, United Kingdom, July 11-14, 2016

6. *(contributed talk)* ***Regulation on the growth and migration of glioblastoma multiforme: Approach using optimal control theory***, **International Conference on Partial Differential Equations: General Theory and Variational Problems**, Costabella Tropical Beach Hotel, Cebu, Philippines, January 11-15, 2016

7. *(poster presentation[2])* ***Mathematical Model Providing New Insights into Vascular Refilling During Dialysis***, **American Society of Nephrology: Kidney Week 2014**, Philadelphia, PA, USA, November 11-16, 2014

8. *(contributed talk)* ***Sensitivity Analysis and Parameter Estimation of a Vascular Refilling Model***, **SMB 2014 Annual Meeting of the Society for Mathematical Biology**, Osaka, Japan, July 28-August 1, 2014

9. *(poster presentation)* ***Stabilizing Control for a Pulsatile Cardiovascular Mathematical Model***, **Asian Mathematical Conference 2013**, Busan, Korea, June 30-July 4, 2013

10. *(poster presentation)* ***Analyis of Feedback in GAL Signalling Cascade***, 8^{th} **European Conference on Mathematical and Theoretical Biology and Annual Meeting of the Society for Mathematical Biology**, Krakow, Poland , June 28-July 2, 2011

11. *(contributed talk)* ***Stabilizing Control for a Pulsatile Cardiovascular Mathematical Model*** , **SMB 2010 Annual Meeting of the Society for Mathematical Biology**, Rio de Janeiro, Brazil, July 26-29, 2010

12. *(invited speaker - MathBio session)* ***A Mathematical Model for the Cardiovascular System Combining Pulsatile and Non-Pulsatile Components***, **2009 Joint Meeting of the Korean Mathematical Society and the American Mathematical Society**, Ewha Womans University, Seoul, Korea, December 16-20, 2009

13. *(oral presentation)* ***Predicting Pulsatile Variations in Finger Arterial Pressure Using a Novel Cardiovascular System Model***, **FEPS 2009**, Ljubljana, Slovenia, November 12-15, 2009

14. *(oral presentation)* ***Modeling Pulsatility in the Human Cardiovascular System***, "SEE doctoral studies in Mathematical Sciences"- Tempus Project, Young Researchers in Mathematics Workshop, **MICOM 2009**, Ohrid, Macedonia, September 16-20, 2009

[1] presented by Pio Gabrielle B. Calderon
[2] presented by Doris H. Fuertinger

National/Local:

1. *(contributed talk)* ***Model Identification of a Cardiovascular-Respiratory System in Response to Constant Workload***, **KSIAM 2018 Annual Meeting**, Ramada Palace, Jeju Island, Republic of Korea, November 2-4, 2018

2. *(invited speaker)* ***Control Aspects of the Cardiovascular-Respiratory System***, **2017 OVPAA Research Symposium**, National Institute of Physics, University of the Philippines Diliman, November 20-21, 2017

3. *(invited speaker)* ***Parameter Estimation of a Vascular Refilling Model***, **2017 Workshop for Mathematical Biology: Recent Topics and Vision of Mathematical Biology in Korea**, Ramada Jeju Hamdeok, Jeju, South Korea, September 29-October 1, 2017

4. *(lecturer)* ***Physiological Complexities under a Mathematical Microscope***, **Workshop on Mathematical Modelling**, Kolehiyo ng Agham Room 301, University of the Philippines Baguio, March 11, 2017

5. *(resource speaker)* ***Understanding Physiological Complexities using a Mathematical Microscope***, Ateneo de Naga University, Naga City, January 25, 2017

6. *(contributed talk)* ***Modeling the Reaction of the Cardiovascular-Respiratory System in Response to a Dynamic Workload***, **2016 Annual Convention of the Mathematical Society of the Philippines**, Bayfront Hotel, Osmea Boulevard, Cebu City, May 30-31, 2016

7. *(poster presetntation)* ***Control of the Human Cardiovascular-Respiratory System in Response to Constant and Periodic Ergometric Workload***, **2016 Annual Convention of the Mathematical Society of the Philippines**, Bayfront Hotel, Osmea Boulevard, Cebu City, May 30-31, 2016

8. *(resource speaker)* ***Researches in Applied Mathematics (Mathematical Biology/Physiology)***, **15^{th} Lecture Series in Mathematics for Secondary and Tertiary Teachers, MSP CAR, Regions 1 and 2,** , University of the Philippines Baguio, Baguio City, December 12, 2015

9. *(contributed talk)* ***Insight on Regulating the Growth and Migration of Glioblastoma Cells: An Optimal Control Theory Approach***, **2015 Annual Convention of the Mathematical Society of the Philippines**, Plaza del Norte Hotel and Convention Center, Laoag City, Ilocos Norte, May 18-19, 2015

10. *(resource speaker)* ***Mathematical Tools Applied to Cancer and Hemodialysis***, **UP Baguio lecture series**, University of the Philippines Baguio, Baguio City, October 24, 2014

11. *(resource speaker)* ***Optimal Control and Parameter Estimation: Tools in Modeling Biological Systems***, **MMOP 2014 seminar**, Nueva Vizcaya State University, Bayombong Nueva Vizcaya, October 21-23, 2014

12. *(contributed talk)* ***Optimal Control Applied to Cell Proliferation and Migration in Glioblastoma***, **KSIAM 2013 Annual Conference**, Seogwipo KAL Hotel, Jeju, Korea, November 22-24, 2013

13. *(contributed talk)* ***Control Aspects for a Pulsatile Cardiovascular Model***, **KSIAM 2013 Spring Conference**, Yonsei University, Seoul, Korea, May 24-25, 2013

14. *(poster presentation)* ***An Excursion to M.A.S.S. (Modeling, Analysis, Stability and Simulation) Towards Understanding GAL Signalling Network***, (Institute of Molecular Life Sciences) **IMLS Scientific Retreat**, Wildhaus, Toggenburg, January 13-15, 2011

15. *(resource speaker)* ***The Mathematical Pulsatile Blood Flow and its Control Mechanisms***, **Breakthroughs in Mathematics XII**, University of the Philippines Baguio, Baguio City, September 18, 2010

16. *(oral presentation)* ***Cardiovascular Dynamics during Rest and Exercise Conditions: A Modeling Approach***, **2010 Mathematical Society of the Philippines Convention**, Cebu City, Philippines, May 20-21, 2010

17. Lecture on ***Visual Calculus***, Continuing Training Program Part IV (CTP 4), University of the Philippines Baguio, April 14-15, 2005

18. Lecture on ***Basic Real Analysis***, Continuing Training Program Part III (CTP 3), Saint Mary's University, Bayombong, Nueva Vizcaya, October 20-24, 2003

CONFERENCES/SCHOOLS/WORKSHOPS ATTENDED

1. **The 5th Joint Workshop of A3 Foresight Program *''Mathematics of Biology, Fluid Dynamics and Material Sciences"***, Lakai Sandpine Hotel, Gangneung, South Korea, October 18-20, 2018

2. **Computational Physiology Modeling Week**, Simula Research Laboratory, Norway, March 20-24, 2017

3. 16$^{\text{th}}$ **International Conference on Dialyis**, ***Advances in Kidney Disease 2014***, Caesars Palace, Las Vegas, Nevada, January 22-24, 2014

4. **Special Highlights on Mathematical Biology**, NIMS, Daejeon, Republic of Korea, June 3-5, 2013

5. **The** 5$^{\text{th}}$ **International Course in Yeast Systems Biology**, Göteborg, Sweden, June 6-23, 2011

6. Mathematical Society of South-Eastern Europe (MASSEE) International Congress on Mathematics, **MICOM 2009**, Ohrid, Macedonia, September 16-20, 2009

7. Bio-Math Summer School and Workshop 2008, **Stochastic Differential Equation Models with Applications to the Insulin-Glucose System and Neuronal Modeling**, Middelfart, Denmark, August 3-16, 2008

8. Summer School and Workshop Graz 2007, **Biomedical Modeling and Cardiovascular - Respiratory Control: Theory and Practice**, Schloss Seggau, Leibnitz, Austria, July 22 - August 4, 2007

RESEARCH VISITS

- Konkuk University, Seoul, South Korea, March 21–April 3, 2018: (on-going) working on avian influenza model using Korean data and valveless pumping
- Renal Research Institute New York, November 6–10, 2017 as *Scientist in Residence (SIR)*; discussed project on modeling global cardiovascular system incorporating vascular-refiling
- Konkuk University, Seoul, South Korea, August 28–October 29, 2017: (on-going) started working on agent-based avian influenza model and valveless pumping
- Institute for Mathematics and Scientific Computing, University of Graz, Austria, July 1–31, 2017:discussed ergometer data and future directions of the cardiovascular-respiratory system model project
- Breath Research Institute, Dornbirn, Austria, June 5–30, 2017: cooperated with mathematical modelling, simulation and experimental verification of concentration profiles of volatile organic compounds in breath during ergometer sessions
- Konkuk University, Seoul, South Korea, March 27–April 7, 2017: drafted the paper on Tuberculosis modeling
- Konkuk University, Seoul, South Korea, December 5–16, 2016: collected data on Tuberculosis in the Philippines, applied optimal control theory for mitigating the disease, performed numerical simulations
- Konkuk University, Seoul, South Korea, September 29–October 3, 2016: discussed brain cancer project extension and TB modeling in the Philippines
- Renal Research Institute New York, June 13–July 8, 2016 as *Scientist in Residence (SIR)*; discussed vascular-refiling model modification and extension, parameter estimation

RESEARCH COLLABORATORS

- Institute for Mathematics and Scientific Computing, University of Graz, Austria
- Department of Mathematics, Konkuk University, Seoul, South Korea
- Breath Research Institute, Dornbirn, Austria
- Renal Research Institute New York

SUPERVISION OF STUDENTS

2. Carlo Delfin S. Estadilla
   "Optimal control of an HIV/AIDS epidemic model using Philippine Data"
   MS Applied Mathematics, November 2018

1. Kurt Jan A. Pumares
   "Cell cycle – coupled Glioblastoma dynamics under optimal control strategies"
   MS Applied Mathematics, May 2018
   co-adviser: Eunok Jung, Konkuk University, South Korea

COURSES TAUGHT

- Algebra and Trigonometry
- Calculus series (I,II,III)
- Elementary Differential Equations
- Numerical Analysis
- Mathematical Biology
- Optimal Control Applied to Biological Models

March 2019