DANAI GEORGIA TOPOUZA

PERSONAL STATEMENT

I am a recent graduate from the MSc program in the Department of Biomedical and Molecular Sciences at Queen's University.
My research interest lies in studying complex human diseases using bioinformatics and data mining approaches to uncover disease mechanisms and assist in drug target discovery.
My current work investigates the chemotherapy response in ovarian cancer patients through RNA-seq data analysis. My aim is to identify gene expression networks, miRNA networks, and genomic variants that are associated with a poor chemotherapy response. I expect that these results will highlight the underlying chemotherapy resistance pathways and provide new targets for patient screening and pharmaceutical applications.
My practical skills include:

Programming languages:	R, Python, Matlab, Linux (bash), git, Java, C, Haskell, Prolog
Bioinformatics:	Next-generation sequencing and microarray data preprocessing and analysis tools, bioinformatics databases, HPC environments, molecular dynamics software
Machine learning skills:	classification, clustering, pattern recognition algorithms

EDUCATION

Master of Science **2017 – 2019**
Experimental Medicine, Specialization in Bioinformatics
Department of Biomedical and Molecular Sciences, Queen's University, Kingston, ON
Supervisor: Dr. Qingling Duan
Thesis: *Integrated biological networks associated with platinum-based chemotherapy response in high-grade serous ovarian cancer*

Bachelor of Science (Honours) **2013 – 2017**
Biology major, Computer Science minor
Queen's University, Kingston, ON
Supervisor: Dr. Paul G. Young
Thesis: *Copper induced stress response and programmed cell death in Saccharomyces cerevisiae*

RESEARCH EXPERIENCE

MSc Candidate **Sept. 2017 – Sept. 2019**
Computational Genomics Laboratory
Department of Biomedical and Molecular Sciences, Queen's University, Kingston, ON

- Supervisor: Dr. Qingling Duan
- Identified gene transcript and miRNA co-expression networks associated with platinum-based chemotherapy response in high-grade serous ovarian cancer
- Designed RNA-Seq and Whole Exome Sequencing data processing pipelines
- Performed transcriptome, miRNA, eQTL and genomic variant analysis on data from The Cancer Genome Atlas (TCGA)

Undergraduate Research Thesis **Sept. 2016 – Apr. 2017**
Department of Biology, Queen's University, Kingston, ON

- Supervisor: Dr. Paul G. Young
- Undergraduate 12-unit thesis studying programmed cell death in *S. cerevisiae*
- Trained in RNA-Seq data processing and transcriptome analysis
- Thesis submitted to BIOL 537 research course (select students only)

QGEM Dry Lab Executive **May 2016 – Oct. 2016**

Queen's International Genetically Engineered Machine (iGEM) Team
Department of Biomedical and Molecular Sciences, Queen's University, Kingston, ON

- Head of the Dry Lab research team in the Queen's iGEM team for 2016
- Summer research project studying non-ribosomal peptide synthesis
- Trained in molecular dynamics and modeling of protein interactions, machine learning algorithms and energy optimization
- Part of QGEM's 2016 research project for participation at the International Genetically Engineered Machine competition

Research Assistant **Oct. 2015 – Jul. 2016**
Department of Biology, Queen's University, Kingston, ON

- Supervisor: Dr. Tomas Babak
- Collaborated with Dr. Brian DeVeale (University of California, San Francisco)
- Performed statistical analysis and visualization of data for a genome-wide association study on schizophrenia

Lab Assistant Internship **Jun. 2015 – Jul. 2015**
IVF facility, Interbalkan Medical Center, Thessaloniki, Greece

- Supervisor: Dr. Ioannis Tziafetas
- Assisted in laboratory organisation and maintenance in a professional setting, shadowed in handling of human embryonic cells

Lab Volunteer **Jan. 2015 – Oct. 2015**
Department of Biology, Queen's University, Kingston, ON

- Supervisor: Dr. Stephen C. Lougheed
- Performed tissue sampling and preservation of native Ontario snakes to investigate species distribution
- Assisted with genetic analysis (PCR, gel electrophoresis) of collected samples and participated in field work

TEACHING EXPERIENCE

Teaching Assistant **Sept. 2018 – Dec. 2018**
Department of Biomedical and Molecular Sciences, Queen's University, Kingston, ON

- Instructor: Dr. Qingling Duan
- BMED 370: Genetics and Genomics
- Participated in assignment and rubric design, assisted students in online course, marked student assignments

Teaching Assistant **Jan. 2018 – Apr. 2018**
Department of Biomedical and Molecular Sciences, Queen's University, Kingston, ON

- Instructor: Dr. Qingling Duan
- BMED 370: Genetics and Genomics
- Assisted students in online course, marked student assignments

Lab Teaching Assistant **Sept. 2017 – Dec. 2017**
Department of Biology, Queen's University, Kingston, ON

- Instructor: Dr. Robert Snetsinger
- BIOL 102: Introductory Biology of Cells
- Oversaw and marked laboratory sections of the course

Teaching Assistant **Sept. 2016 – Dec. 2016**
School of Computing, Queen's University, Kingston, ON
- Instructor: Dr. Wendy Powley
- CISC 101: Elements of Computer Science, the Python version of the introductory programming course
- Marked assignments and exams, held lab office hours for course help, presented a guest lecture on programming exercises

Teaching Assistant **Sept. 2015 – Dec. 2015**
School of Computing, Queen's University, Kingston, ON
- Instructor: Dr. David Skillicorn
- CISC 101: Elements of Computer Science, the Matlab version of the introductory programming course, with an emphasis on data mining techniques
- Oversaw and marked the laboratory component of the course, managed a class of 40 students and improved their understanding of data analysis and statistics methods

AWARDS

Conference Travel Award (CTA) **22 Oct. 2018**
Queen's University, Kingston, ON
- Awarded to select graduate students in the Department of Biomedical and Molecular Sciences
- Funded travel to the American Society of Human Genetics 2018 Meeting
- Funds awarded: $ 250 (CAD)

International Tuition Award (ITA) **2017 – 2018**
Queen's University, Kingston, ON
- Scholarship awarded to select international graduate students
- Funds awarded: $ 5,000 (CAD)

Principal's Scholarship **2013 – 2014**
Queen's University, Kingston, ON
- Scholarship awarded to students whose high school average is greater than 95%
- Funds awarded: $ 6,000 (CAD)

PROFESSIONAL ACTIVITIES

Professional Extension

KHSC/QU Innovation Workshop on Digital Health, Machine Learning and AI **3 Feb. 2020**
Donald Gordon Hotel and Conference Centre, Kingston, ON

Graduate Management Consulting Association (GMCA) mini-MBA **Nov. 2017 – Dec. 2018**
Queen's University, Kingston, ON

CISC 859: Pattern Recognition (Audit) **Jan. – Apr. 2019**
Goodwin Hall, Queen's University, Kingston, ON

ASHG/IGES/ISCB Joint Symposium: **16 Oct. 2018**
Working with Big Data in the Cloud--Research and Privacy
San Diego Convention Center, San Diego, CA

HPC Summer School 2018: Bioinformatics Workflows **3 Aug. 2018**
Chernoff Hall, Queen's University, Kingston, ON

The High Performance Computing Symposium (HPCS) **6 - 9 Jun. 2017**
Queen's University, Kingston, Ontario

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Professional Memberships

The American Society of Human Genetics **2018 - 2019**

PUBLICATIONS

1. Choi, J., **Topouza**, **D.G.**, Tarnouskaya, A., Nesdoly, S., Koti, M., and Duan, Q.L. Gene networks and expression quantitative trait loci associated with platinum-based chemotherapy response in high-grade serous ovarian cancer. *bioRxiv* 740696 (2019)

In preparation

1. **Topouza**, **D.G.**, Choi, J., Nesdoly, S., and Duan, Q.L. Integrated biological networks associated with platinum-based chemotherapy response in high-grade serous ovarian cancer

PUBLISHED ABSTRACTS

1. **Topouza**, **D.G.**, Choi, J., Nesdoly, S., and Duan, Q.L. *Biological networks modulating chemotherapy response in ovarian cancer; (Abstract #685)*. The 68th Annual Meeting of The American Society of Human Genetics (2018).
2. **Topouza**, **D.G.**, Choi, J., Nesdoly, S., and Duan, Q.L. *Gene expression networks modulating chemotherapy response in ovarian cancer*. The 3rd Annual Toronto RNA Enthusiast's Day (2018).
3. **Topouza**, **D.G.**, Choi, J., Nesdoly, S., and Duan, Q.L. *Biological networks modulating chemotherapy response in ovarian cancer*. The 21st Annual Scientific Meeting for Health Science Research Trainees (2018).
4. Chiriac, D.S., **Topouza**, **D.G.**, Tanwani, J., Wang, Y., and Allingham, J. *Pharming The Blues: Improving biosynthesis of natural products.* The 12th Annual International Genetically Engineered Machine (iGEM) Competition (2016).

POSTERS AND PRESENTATIONS

Oral presentations

1. **The Twenty-Second Annual Scientific Meeting for Health Science Research Trainees** **4 Jun. 2019**
   School of Medicine Building, Queen's University, Kingston, ON
   Novel biological networks associated with chemotherapy response in high-grade serous ovarian cancer
2. **Masters Student Symposium Seminar Presentation** **26 Feb. 2019**
   Botterell Hall, Queen's University, Kingston, ON
   Biological networks modulating chemotherapy response in ovarian cancer
3. **Masters Student Symposium Seminar Presentation** **24 Apr. 2018**
   Botterell Hall, Queen's University, Kingston, ON
   A pharmacogenomics analysis of biological networks regulating chemotherapy response among ovarian cancer patients
4. **Undergraduate Thesis Seminar Presentation** **11 Nov. 2016**
   Biosciences Complex, Queen's University, Kingston, ON
   Programmed cell death in the unicellular eukaryote *Saccharomyces cerevisiae*

Poster presentations

5. **American Society of Human Genetics (ASHG) 2018 Meeting** **16 - 20 Oct. 2018**
   San Diego Convention Center, San Diego, CA
   Topouza, **D.G.**, Choi, J., Nesdoly, S., and Duan, Q.L. *Biological networks modulating chemotherapy response in ovarian cancer; (Abstract #685)*
6. **Toronto RNA Enthusiast's Day** **31 Jul. 2018**
   SickKids Peter Gilgan Centre for Research and Learning, Toronto, ON

Topouza, **D.G.**, Choi, J., Nesdoly, S., and Duan, Q.L. *Gene expression networks modulating chemotherapy response in ovarian cancer*

7. **The Twenty-First Annual Scientific Meeting for Health Science Research Trainees** **13 Jun. 2018**
   Biosciences Complex, Queen's University, Kingston, ON
   Topouza, **D.G.**, Choi, J., Nesdoly, S., and Duan, Q.L. *Biological networks modulating chemotherapy response in ovarian cancer*
8. **Undergraduate Thesis Poster Presentation** **10 Mar. 2017**
   Biosciences Complex, Queen's University, Kingston, ON
   Topouza, **D.G.**, and Young, P.G. *Programmed cell death in the unicellular eukaryote Saccharomyces cerevisiae*
9. **International Genetically Engineered Machine Competition (Bronze medal)** **27 - 31 Oct. 2016**
   Hynes Convention Center, Boston, MA
   Chiriac, D.S., **Topouza**, **D.G.**, Tanwani, J., Wang, Y., and Allingham, J. *Pharming The Blues: Improving biosynthesis of natural products*
10. **Scinapse Undergraduate Science Case Competition (Finalist)** **Feb. 2016**
    Western University, London, ON
    Nowak, S., Thomsen, C., and **Topouza, D.G.** *The role of mycorrhizal community assemblages in agricultural productivity*