DANAI GEORGIA TOPOUZA

PERSONAL STATEMENT

I am a recent MSc graduate from the Department of Biomedical and Molecular Sciences at Queen's University. My research interests lie in studying complex human diseases using bioinformatics and data mining approaches. My current work investigates 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 response to first-line treatment. These results will highlight underlying chemotherapy resistance pathways and can provide new targets for patient screening and pharmaceutical applications.

My practical skills include:

Programming languages	R, Python, Matlab, Linux (bash), git, Java, C
Bioinformatics	Next-generation sequencing data preprocessing and analysis, microarray data preprocessing and analysis, omics integration, 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

Bioinformatics Research Associate   Jan. 2020 – Present
Computational Genomics Laboratory
Department of Biomedical and Molecular Sciences, Queen's University, Kingston, ON
- Completing projects for publication in scientific journals
- Co-leading research project on methylation profiling of hepatocellular carcinoma (TCGA)
- Contributing to writing and analysis for grant applications (literature review, power calculations)

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)
- Oversaw and mentored a Masters of Biomedical Informatics student (Sorin Park, MBI 2018). Identified genes and co-expression networks associated with response to different combination treatments in chronic myeloid leukemia

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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
- Supervisors: Dr. Tomas Babak and Dr. Brian DeVeale (University of California, San Francisco)
- Performed statistical analysis and data visualization 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 MD
- Assisted in laboratory organisation and maintenance in a professional setting, shadowed in handling of human embryonic cells

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

Laboratory 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

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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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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 adjuvant chemotherapy response in high-grade serous ovarian cancer.* BMC Cancer 20, 413 (2020). https://doi.org/10.1186/s12885-020-06922-1

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*