

# Xi Zhang

## Curriculum Vitae (4 pages)

### Sep 2021

#### Contact Information

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Address: Department of Biochemistry & Molecular Biology, Dalhousie University  
5850 College Street, Room 9-B1  
Sir Charles Tupper Medical Building  
PO Box 15000  
Halifax, Nova Scotia, Canada B3H 4R2

Email: xzha25 [A+T] uwo DOT ca

Website: xizhanglab.weebly.com

#### Research Interest

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- Design and develop bioinformatics software tools (e.g., HSDFinder and NoBadWordsCombiner)
- Build and maintain biological databases (e.g., HSDatabase)
- Conduct and analyze data analysis to address interesting biological questions.  
(e.g., Using the state-of-the-art DNA-Seq and RNA-Seq techniques with comparative genomics approaches to unravel common mechanisms in the adaptation to cold environments via the psychrophilic green alga UWO241 and other closely related algal species.)

#### Research projects:

1. The unicellular Antarctic green alga *Chlamydomonas* sp. UWO241 genome project - genome assembly (2017-2018), genome annotation (2018-2019), comparative genomic analysis (2019-2021)
  - Sequencing and assembling the nuclear genome of the Antarctic psychrophilic green alga *Chlamydomonas* sp. UWO241: unravelling the evolution of cold adaptation
2. UWO241 transcriptome project - RNA-Seq analysis (2020-Current)
  - A Constitutive Stress Response is an Adaptation to Low Temperature in the Antarctic green alga *Chlamydomonas* sp. UWO241
3. Organelle genomics - Mitochondrial and chloroplast in the chlamydomonadalean green alga *Haematococcus lacustris* (strain UTEX 2505) (2017-2019)
  - The mitochondrial and chloroplast genomes of the green alga *Haematococcus* are largely made up of nearly identical repetitive sequences.
4. Bioinformatics software development - HSDFinder, HSDatabase, and NoBadWordsCombiner (2020-Current)
  - Protocol for HSDFinder to help identify, categorize and annotate duplicate genes in eukaryotic nuclear genomes.
  - Protocol for using NoBadWordsCombiner to merge and minimize 'bad words' from BLAST hits against multiple eukaryotic gene annotation databases.
  - HSDFinder: a BLAST-based strategy to search for highly similar duplicated genes in eukaryotic genomes.
  - HSDatabase - a database of highly similar duplicate genes in eukaryotic genomes.

#### Positions & Education

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**Postdoc** Biochemistry & Molecular Biology, Dalhousie University, Halifax, Nova Scotia, Canada, Sep 2021 – Current

**Researcher** Biology, Western University, London, Ontario, Canada, Mar 2021 – May 2021

**PhD** Biology, Western University, London, Ontario, Canada, Sep 2016 – Feb 2021

**MSc** (Biophysics/Bioinformatics), Science, Tianjin University, Tianjin, China, Sep 2013 – Jul 2016.

**BSc** (Materials), Engineering, Tianjin University, Tianjin, China, Sep 2008 – Jul 2012.

#### Awards

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- 2021 Post-Graduate Research Assistantship Program (March to May), Biology Department, Western University, London, ON, Canada
- 2020/21, Academic Joint Fund for Support of Graduate Student Research and Scholarship, Society of Graduate Students (SOGS), Western University, London, ON, Canada
- 2016/20, Teaching Assistantship Fellowship and Research Assistantship Fellowship. Biology Department, Western University, London, ON, Canada.
- 2019/20, Travel subsidy, Biology Department, Western University, London, ON, Canada
- 2018/19, Travel subsidy, Biology Department, Western University, London, ON, Canada

- 2015/16 Excellent Student Leader, Tianjin University, Tianjin, China (awarded to students who rank top 10% and undertake class leader)
- 2014/15 Excellent Student Leader, Tianjin University, Tianjin, China (awarded to students who rank top 10% and undertake class leader)

## Academic Metrics

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**Peer-reviewed: 5**   **Under review: 4**

**Google Scholar** ([link](#)): H-index = 3, i10-index = 1, citations =40 (as of 1 Sep 2021).

**ResearchGate:** [link](#) | **ORCID:** [link](#)

## Publications

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### Refereed Academic Papers

9. **Xi Zhang\***, Yining Hu, David Roy Smith\*. Protocol for using NoBadWordsCombiner to merge and minimize 'bad words' from BLAST hits against multiple eukaryotic gene annotation databases. *Star Protocols* (Under Review). 2021
8. David R. Smith, Arthur Leung, **Xi Zhang**, Marina Cvetkovska, Rachael Morgan-Kiss, Norman P. A. Hüner (2021). The cold-loving Antarctic alga UWO241: it takes a licking and keeps on ticking. *Frontiers in Young Minds*. (Under Review) Note: Popular science journal reviewed by kids. 2021
7. Norman P.A. Hüner, David R. Smith, Marina Cvetkovska, **Xi Zhang**, Alexander G. Ivanov, Beth Szyszka-Mroz, Rachael Morgan-Kiss. Photosynthetic Adaptation to Polar Life: Photopsychrophily and Psychrotolerance as Emergent Properties. *Journal of Plant Physiology | Humboldt Reviews* (Under Review) 2021
6. Marina Cvetkovska, **Xi Zhang**, Galyna Vakulenko, Samuel Benzaquen, Beth Szyszka-Mroz, Nina Malczewski, David R. Smith, Norman P.A. Hüner (2021) A Constitutive Stress Response is an Adaptation to Low Temperature in the Antarctic green alga *Chlamydomonas* sp. UWO241. *Plant, Cell & Environment* (Under Review) 2021
5. **Xi Zhang\***, Yining Hu, David Roy Smith\*. Protocol for HSDFinder to help identify, categorize and annotate duplicate genes in eukaryotic nuclear genomes. *STAR Protocols*. <https://doi.org/10.1016/j.xpro.2021.100619> 2021
4. **Xi Zhang**, Marina Cvetkovska, Rachael Morgan-Kiss, Norman P. A. Hüner, David Roy Smith. Draft genome sequence of the Antarctic green alga *Chlamydomonas* sp. UWO241. *iScience*. <https://doi.org/10.1016/j.isci.2021.102084>. 2021
3. **Xi Zhang**, Bauman N, Brown R, Richardson TH, Akella S, Hann E, Morey R, Smith DR. The mitochondrial and chloroplast genomes of the green alga *Haematococcus* are largely made up of nearly identical repetitive sequences. *Current Biology*; doi: [org/10.1016/j.cub.2019.06.040](https://doi.org/10.1016/j.cub.2019.06.040). 2019
2. **Xi Zhang**, Chong Peng, Ge Zhang and Feng Gao. Comparative analysis of essential genes in prokaryotic genomic islands. *Scientific Reports* 5, 12561; doi: [10.1038/srep12561](https://doi.org/10.1038/srep12561). 2015
1. Chong Peng, Hao Luo, **Xi Zhang** and Feng Gao. Recent advance in the genome-wide study of DNA replication origins in yeast. *Frontiers in Microbiology* 6,117; doi: [10.3389/fmicb.2015.00117](https://doi.org/10.3389/fmicb.2015.00117). 2014

### Academic Papers in manuscript [total = 2]

- **Xi Zhang\***, Yining Hu, David Roy Smith\*. HSDFinder: a BLAST-based strategy to search for highly similar duplicated genes in eukaryotic genomes. (In submission)
- **Xi Zhang\***, Yining Hu, David Roy Smith\*. **HSDatabase** - a database of highly similar duplicate genes in eukaryotic genomes. *Bioinformatics* (Manuscript).

## Talks & Conferences

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### International Conference Presentations

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|----|--------|---|----------------------------|----------|
| 5. | Talk   | <b>Xi Zhang</b> . Biology Virtual Symposium on Bioinformatics (BVSBS_2021)  | Virtual (Canada and China) | Mar 2021 |
| 4. | Talk   | <b>Xi Zhang</b> , David Smith. The UWO241 genome joint meeting.   | Virtual (USA and Canada)   | Feb 2021 |
| 3. | Poster | <b>Xi Zhang</b> , David Smith. Unravelling Cold Adaptation via the genome of Antarctic Psychrophilic Green Alga. The international Plant and Animal Genome XXVI Conference (PAG). | San Diego, CA, USA         | Jan 2017 |
| 2. | Poster | Hao Luo, Chong Peng, <b>Xi Zhang</b> , Ge Zhang and Feng Gao. Essential genes database 10.0 (2015) The 8th international Biocuration Conference.                                  | Beijing, China             | Oct 2015 |

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|----|--------|--|-----------------|----------|
| 1. | Poster | Hao Luo, Chong Peng, Ge Zhang, <b>Xi Zhang</b> , Yan Lin and Feng Gao. Zcurve and Doric softwares. The 6th National Bioinformatics Conference. | Nan Jing, China | Oct 2014 |
|----|--------|--|-----------------|----------|

### Domestic Conference Presentations

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|----|--------|--|------------------------------|----------|
| 8. | Poster | <b>Xi Zhang</b> , David Smith (2021) Is gene duplication driving cold adaptation in the Antarctic green alga <i>Chlamydomonas</i> sp. UWO241? 51st Ontario Ecology, Ethology and Evolution Colloquium (OE3C) [Poster]  | Virtual (Guelph, ON, Canada) | May 2021 |
| 7. | Talk   | <b>Xi Zhang</b> , Yining Hu, David Smith (2021) Using Bioinformatics tools (HSDFinder and HSDatabase) to predict and collect highly similar duplicates in eukaryotic genomes. SOGS Annual Western Research Forum (WRF2021). [10-min oral] ( <b>Forthcoming</b> ) | Virtual (London, ON, Canada) | Mar 2021 |
| 6. | Talk   | <b>Xi Zhang</b> . The draft genome of the Antarctic psychrophilic green alga <i>Chlamydomonas</i> sp. UWO241 providing insights into the evolution of cold adaption. The 49th Ontario Ecology, Ethology and Evolution Colloquium (OE3C). [15 mins Standard talk] | Hamilton, ON, Canada         | May 2019 |
| 5. | Poster | <b>Xi Zhang</b> . Sequencing and assembling the nuclear genome of the Antarctic psychrophilic green alga <i>Chlamydomonas</i> sp. UWO241. Canadian Society for Plant Biologists, Eastern Regional Meeting  | London, ON, Canada           | Dec 2018 |
| 4. | Talk   | <b>Xi Zhang</b> . Sequencing and assembling the nuclear genome of the Antarctic psychrophilic green alga <i>Chlamydomonas</i> sp. UWO241: Unravelling the cold-adaption strategies. The 9th annual Biology Graduate Research Forum (BGRF) [12 min Standard talk] | London, ON, Canada           | Oct 2018 |
| 3. | Poster | <b>Xi Zhang</b> . Sequencing and assembling the nuclear genome of the Antarctic psychrophilic green alga <i>Chlamydomonas</i> sp. UWO241: Unravelling the cold-adaption strategies. The 48th Ontario Ecology, Ethology and Evolution Colloquium (OE3C).          | London, ON, Canada           | May 2018 |
| 2. | Poster | <b>Xi Zhang</b> , David Smith. Sequencing and assembling the nuclear genome of the Antarctic psychrophilic green alga <i>Chlamydomonas</i> sp. UWO241: Unravelling the cold-adaption strategies. The 8th annual Biology Graduate Research Forum (BGRF).          | London, ON, Canada           | Oct 2017 |
| 1. | Poster | <b>Xi Zhang</b> , Feng Gao. Comparative analysis of essential genes in prokaryotic genomic islands. The 7th annual Biology Graduate Research Forum (BGRF).   | London, ON, Canada           | Oct 2016 |

### Funding

#### Grants awarded (values in Canadian dollars)

- **Xi Zhang**. Post-Graduate Research Assistantship Program (Biology Department, Western University, London, ON, Canada) ~\$2400/month 2021.3-5
- **Xi Zhang**. Teaching Assistantship and Research Assistantship (Biology Department, Western University, Canada) ~\$14,000/year 2016-20
- **Xi Zhang**. Outstanding student scholarship (School of Science, Tianjin University, China) ~\$2,000/year 2013-16

#### Grants Submitted

*None at present.*

#### Notable Unsuccessful Grants

*None at present*

### Supervision of Students

#### Undergraduate Students

ADVISORY ROLE	STUDENT NAME	START/FINISH
Honors Thesis Advisor	Ms. Zoe Klein	Sep 2020 – April 2021

ADVISORY ROLE	STUDENT NAME	START/FINISH
<b>Volunteer/Summer Research</b>	Mr. Udara Jayawardena	Dec 2018 – April 2019
<b>Student Supervision</b>	Mr. Shane Orgnero	May 2018 – July 2018

## Teaching Assistant (TA)

### Undergraduate Courses (Western University)

- Biology 2290F–Scientific Methods in Biology (virtual tutorial) *Instrumentation Unit, answering the questions (OWL forum), marking (Gradescope), proctoring (Proctortrack).* Sep 2020–Dec 2020
- Biology 2290G–Scientific Methods in Biology (lab) *Dean Unit, four rotations, 50 students, ~5hrs/week, work students through experiments, marking, proctoring* Jan 2020–April 2020
- Biology 2290F–Scientific Methods in Biology (lab) *Zabulionis Unit, four rotations, 50 students, ~5hrs/week, work students through experiments, marking, proctoring* Sep 2019–Dec 2019
- Biology 2290G–Scientific Methods in Biology (lab) *Zabulionis Unit, four rotations, 50 students, ~5hrs/week, work students through experiments, marking, proctoring* Jan 2019–April 2019
- Biology 1001A/1201A – General Biology (tutorial) *Taught in Classroom around 40 students. ~4 hs/week. Teaching materials presentation, marking, proctoring.* Sep 2018–Dec 2018
- Biology 3595B – Advanced Genetics (tutorial) *Work students through the lecture materials, marking, proctoring* Jan 2018–April 2018
- Biology 1001A/1201A – General Biology (lab) *Twice a week. Lab hour ~6hs/week. Lab contents include Lab demonstration talk, answering students' questions, marking, proctoring.* Sep 2017–Dec 2017
- Biology 1001A/1201A – General Biology (lab) *Twice a week. Lab hour ~6hs/week. Lab contents include Lab demonstration talk, answering students' questions, marking, proctoring.* Sep 2016–April 2017

### Outreach & Science Communication (Western University)

- Biology Virtual Symposium on Bioinformatics (BVSB\_2021) (Chairman) Mar 2021
- Canada National Scholarship Ranking (volunteer for a week) Feb 2021
- Christmas Door Decorations (Host, targeting for the community of Biology graduates on and off campus) Dec 2020
- China Science Writers Association (CSWA) visit to Western (Coordinator, 2 days ) Sep 2018
- Welcome Team Volunteers of Volunteer in Progress (VIP) program (6 weeks, 6 hours/week) 2017-2018
- International Graduate Student Day (Volunteer 3 hours) Sep 2017
- The committee member of International Graduate Student issues committee (IGSIC) of SOGS Sep 2017/18
- The SOGS representative of Society of Biology Graduate Student (SOBGS) Sep 2017/18
- Western goes global cultural showcase (Performer) Nov 2016

## Professional Development & Training

### Workshop Participation

- PATH9577B/BIOL9919B - Applied Bioinformatics *One-term, three hours per week plus home assignments by Western Biology Department. The graduate training course incorporated R, Python, Unix-like programming languages in solving biology questions.* Jan-April 2019
- Canadian Bioinformatics Workshops: Informatics on RNA-Seq Analysis *Three-day workshop of Informatics on RNA-Seq Analysis by Canadian Bioinformatics Workshop in Toronto.* July 2017
- Canadian Bioinformatics Workshops: Informatics on High Throughput Sequencing Data *Two-day workshop of Informatics on High-Throughput Sequencing Data by Canadian Bioinformatics Workshop in Toronto.* May 2017

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|---|---|-----------|
| • Mustang Bioinformatics Club:<br>Software Carpentry &<br>Bioinformatics Workshop | <i>One-day workshop of Bioinformatics software and tools training by students from Western Biology.</i>   | Feb 2017  |
| • Western teaching Assistant<br>Training Program                                  | <i>Three-day training by Western Teaching Support Centre on using technology in undergraduate instruction (presentations &amp; lectures).</i>                             | Aug 2016  |
| • English Conversation Program  | <i>8 weeks, once a week, each time 2hrs by Western International &amp; Exchange Student Center for communicating in groups on different topics (conversation skills).</i> | 2016-2017 |

## Courses

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- 2019 BIOLOGY 9919B APPLIED BIOINFORMATICS
- 2018 BIOLOGY 3594B DNA:GENOME ORG, MUTAGEN & RPR (Audit)
- 2018 BIOLOGY 2581B GENETICS (Audit)
- 2017 BIOLOGY 9561B GENES AND GENOMES I
- 2017 BIOLOGY 9561A GENES AND GENOMES I
- 2016 BIOCHEM 9545Q BIOINFORMATICS I
- 2016 BIOCHEM 9546R BIOINFORMATICS II

## Extracurricular

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- Dec 2020 | Christmas Door Decorations (Biology Department, Western University, London, ON, Canada)
- May 2018 | Goodlife fitness Toronto Marathon (42.195km, Toronto, ON, Canada)
- Oct 2018 | Scotiabank Toronto Waterfront Marathon (42.195km, Toronto, ON, Canada)
- May 2017 | Goodlife fitness Toronto Marathon (42.195km, Toronto, ON, Canada)
- Dec 2015 | Shenzhen International Marathon (42.195km, 4h33min, full-marathon, Shenzhen, China)
- Sep 2015 | Tianjin Wuqing Development Area Cup International Marathon (2h14min, half-marathon, Tianjin, China)

Xi Zhang

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