

RYAN K SCHOTT

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APPOINTMENTS & EDUCATION

Postdoctoral Research Biologist (2018–), National Museum of Natural History, Smithsonian Institution
(Advisor: Rayna Bell)

PhD (2018), Ecology and Evolutionary Biology, University of Toronto (Advisor: Belinda Chang)

MSc (2011), Ecology and Evolutionary Biology, University of Toronto (Advisor: David Evans)

HBSc (2008), High Distinction, Evolutionary Biology, University of Toronto (Advisor: David Evans)

PEER-REVIEWED PUBLICATIONS

(*equal contribution; ^Uundergraduate author)

Summary: 9 first authored, 14 co-authored, h-index: 13

23. Schott RK, N Bhattacharyya, BSW Chang. 2019. Evolutionary signatures of photoreceptor transmutation in geckos reveal potential adaptation and convergence with snakes. *Evolution* 73: 1958–1971.
22. Gutierrez EA, GM Castiglione, JM Morrow, RK Schott, LO Loureiro, BK Lim, BSW Chang. 2018. Functional shifts in bat dim-light visual pigments are associated with differing echolocation abilities and reveal molecular adaptation to photic-limited environments. *Molecular Biology and Evolution* 35: 2422–2434.
21. Perry BW*, DC Card*, ... RK Schott, ... TA Castoe [32 authors total]. 2018. Molecular adaptations for sensing and securing prey, and insight into amniote genome diversity, from the garter snake genome. *Genome Biology and Evolution* 10: 2110–2129.
20. Gutierrez EA, RK Schott, MW Preston^U, LO Loureiro, BK Lim, BSW Chang. 2018. The role of ecological factors in shaping bat cone opsin evolution. *Proceedings of the Royal Society B* 285: 20172835.
19. Schott RK, A Van Nynatten, DC Card, TA Castoe, BSW Chang. 2018. Shifts in selective pressures on snake phototransduction genes associated with photoreceptor transmutation and dim-light ancestry. *Molecular Biology and Evolution* 35: 1376–1389.
18. Castiglione GM, RK Schott, FE Hauser, BSW Chang. 2018. Convergent selection pressures via divergent mechanisms drive the evolution of rhodopsin kinetics at high altitudes. *Evolution* 72: 170–186.
17. Schott RK, B Panesar^U, DC Card, M Preston^U, TA Castoe, BSW Chang. 2017. Targeted capture of complete coding regions across divergent species. *Genome Biology and Evolution* 9: 398–414.
16. Hauser FE, KL Ilves, RK Schott, GM Castiglione, H López-Fernández, BSW Chang. 2017. Accelerated evolution and functional divergence of the dim light visual pigment accompanies cichlid colonization of Central America. *Molecular Biology and Evolution* 34: 2650–2664.
15. Castiglione GM, FE Hauser, BS Liao^U, NK Lujan, A Van Nynatten, JM Morrow, RK Schott, N Bhattacharyya, SZ Dungan, BSW Chang. 2017. Evolution of nonspectral rhodopsin function at high altitudes. *Proceedings of the National Academy of Sciences of the United States of America* 114: 7385–7390.

14. Bhattacharyya N, B Darren^U, **RK Schott**, V Tropepe, BSW Chang. 2017. Cone-like rhodopsin expressed in the all cone retina of the colubrid pine snake as a potential adaptation to diurnality. *Journal of Experimental Biology* 220: 2418–2425.
13. Morrow JM, S Lazic, DM Fox, C Kuo, **RK Schott**, E Gutierrez, F Santini, V Tropepe, BSW Chang. 2017. A second visual rhodopsin gene, rh1-2, is expressed in zebrafish photoreceptors and found in other ray-finned fishes. *Journal of Experimental Biology* 220: 294–303.
12. **Schott RK**, J Müller, CGY Yang, N Bhattacharyya, N Chan^U, M Xu^U, JM Morrow, A-H Ghenu^U, ER Loew, V Tropepe, BSW Chang. 2016. Evolutionary transformation of rod photoreceptors in the all-cone retina of a diurnal garter snake. *Proceedings of the National Academy of Sciences of the United States of America* 113: 356–361.
11. **Schott RK**, DC Evans. 2016. Cranial variation and systematics of *Foraminacephale brevis* gen. nov. and the diversity of pachycephalosaurid dinosaurs (Ornithischia: Cerapoda) in the Belly River Group of Alberta, Canada. *Zoological Journal of the Linnean Society* doi: 10.1111/zoj.12465.
10. Elbassiouny AA^U, **RK Schott**, JC Wadell, MA Kolmann, E Lehmborg, A Van Nynatten, WGR Crampton, BSW Chang, NR Lovejoy. 2016. Mitochondrial genomes of the South American electric knifefishes (Order Gymnotiformes). *Mitochondrial DNA Part B* 1: 401–403.
9. Hauser FE, **RK Schott**, GM Castiglione, A Van Nynatten, A Kosyakov^U, PL Tang^U, DA Gow^U, BSW Chang. 2016. Comparative sequence analyses of rhodopsin and RPE65 reveal patterns of selective constraint across hereditary retinal disease mutations. *Visual Neuroscience* 33: E002.
8. Bickelmann C, JM Morrow, J Du, **RK Schott**, I van Hazel, S Lim^U, J Müller, BSW Chang. 2015. The molecular origin and evolution of dim-light vision in mammals. *Evolution* 69: 2995–3003.
7. **Schott RK***, S Refvik*, FE Hauser, H López-Fernández, BSW Chang. 2014. Positive Selection at Non-Overlapping Sites in Rhodopsin from Lake and Riverine Cichlids. *Molecular Biology and Evolution* 31: 1149–1165.
6. Williams R, X Ma*, **RK Schott***, N Mohammad, CY Ho, CF Li, BSW Chang, M. Demetriou, JW Dennis. 2014. Encoding asymmetry of the n-glycosylation motif facilitates glycoprotein evolution. *PLoS ONE* 9: e86088.
5. Castoe TA, ... **RK Schott**, ... DD Pollock [39 authors total]. 2013. The Burmese python genome reveals the molecular basis for extreme adaptation in snakes. *Proceedings of the National Academy of Sciences of the United States of America* 110: 20645–20650.
4. Evans DC, **RK Schott**, D Larson, C Brown, MJ Ryan. 2013. The oldest North American pachycephalosaurid and the hidden diversity of small-bodied ornithischian dinosaurs. *Nature Communications* 4: 1828.
3. **Schott RK**, DC Evans. 2012. Squamosal ontogeny and variation in the pachycephalosaurian dinosaur *Stegoceras validum* from the Dinosaur Park Formation, Alberta. *Journal of Vertebrate Palaeontology* 32: 903–913.
2. **Schott RK**, DC Evans, MB Goodwin, CM Brown, JR Horner, NR Longrich. 2011. Cranial ontogeny in *Stegoceras validum* (Dinosauria: Pachycephalosauria): a quantitative model of pachycephalosaur dome growth and variation. *PLoS ONE* 6: e21092.
1. **Schott RK**, DC Evans, TE Williamson, TD Carr, MB Goodwin. 2009. The anatomy and systematics of *Colepiocephale lambei* (Dinosauria: Pachycephalosauridae). *Journal of Vertebrate Paleontology* 29: 771–786.

PREPRINT PUBLICATIONS

Gemmel NJ, ... **RK Schott**, ... Ngatiwai Trust Board [60 authors total]. 2019. The tuatara genome: insights into vertebrate evolution from the sole survivor of an ancient reptilian order. *bioRxiv*. doi: 10.1101/867069. *Currently in revision.*

Schott RK*, D Gow*, BSW Chang. 2019. BlastPhyMe: A toolkit for rapid generation and analysis of protein-coding sequence datasets. *bioRxiv*. doi: 10.1101/059881.

BOOK AND ENCYCLOPEDIA CHAPTERS

Schott RK. 2017. Squamate Sensory Systems. In: Vonk J, Shackelford T, editors. Encyclopedia of Animal Cognition and Behavior. Cham: Springer International Publishing. p. 1-9.

AWARDS, GRANTS & SCHOLARSHIPS

2018	SMBE Young Investigator Travel Award (\$2,000)
2017	Peter A. Abrams Prize for Research Excellence (\$500)
2017	Gans Collections and Charitable Fund Conference Attendance Grant (\$600)
2016–2017	Doctoral Completion Award (\$1,350)
2015–2016	Vision Science Research Program Scholarship (\$27,841)
2015	Frederick P. Ide Graduate Award in Ecology and Evolutionary Biology (\$750)
2015	Ontario Graduate Scholarship (\$15,000)
2014–2015	Vision Science Research Program Scholarship (\$18,840)
2014	Ontario Graduate Scholarship (\$15,000)
2013–2014	Vision Science Research Program Scholarship (\$14,840)
2011	Jackson School of Geosciences Student Member Travel Grant (\$400)
2011–2013	NSERC Postgraduate Scholarship D (\$63,000)
2010	Doris O. and Samuel P. Welles Research Fund (\$2,000)
2009	DRI Student Oriject Grant (\$2,000)
2009–2010	NSERC Canada Graduate Scholarship M (\$17,500)
2008	Frederick P. Ide Graduate Award in Ecology and Evolutionary Biology (\$994)
2008	CS Rufus Churcher Graduate Award in Zoology (\$1,164)
2008	Helen Sawyer Hogg Graduate Admission Award (\$5,000)

TEACHING EXPERIENCE

Teaching Assistant

- Molecular Evolution (2016)
- Comparative Vertebrate Anatomy (2008–2016)
- Evolutionary Genetic Analyses using PAML Graduate Course (2013)
- Molecular and Cell Biology (2011)
- Adaptation and Diversity (2010)

- Macroeolution (2008–2010)

MENTORING EXPERIENCE

Undergraduate Student Research Projects

- John Boyette (NMNH, 2019): Evolution of Non-visual Opsin Genes across the Frog Tree of Life. Ongoing project.
- Maya Woolfolk (NMNH, 2018): Molecular Evolution of Phototransduction Genes during Major Life History Transitions in Frogs. Ongoing project.
- Matthew Preston (U of T, 2015–2017): *De novo* assembly methods for complete coding regions from hybrid enrichment data, co-author on a published article.
- Mark Hibbins (U of T, 2015–2016): Molecular evolution of lens crystallin genes in snakes. Article in preparation.
- Daniel Gow (U of T, 2013–2015): BlastPhyMe: A toolkit for rapid generation and analysis of protein-coding sequence datasets, co-lead, preprint on bioRxiv. Also co-author on a published article.
- Bhawandeep Panesar (U of T, 2013–2015): NGS Data Analysis, development of scripts and methods, co-author on a published article.
- Benedict Darren (UofT, 2011–2013): Characterizing the visual pigment complement of the northern pine snake *P. melanoleucus*, co-author on a published article.

Work Study Students and Volunteers

Xiaotong Yang, Jiayang (Kelly) Wu, Lubna Waheed, Seemi Qaiser, River Jiang, Trevor Sless, Te (Fred) Chen

INVITED PRESENTATIONS

2019 Department of Biology, University of Oklahoma, Norman, OK
 2019 Department of Biology, University of Texas Arlington, Arlington, TX
 2018 Department of Biology, Utah State University, Logan, UT
 2018 Department of Life Sciences, Natural History Museum, London, UK
 2018 Behavior, Ecology, Evolution, and Systematics (BEES), University of Maryland, College Park, MD
 2018 National Eye Institute, National Institute of Health, Bethesda, MD
 2018 Department of Zoology, Smithsonian National Museum of Natural History, Washington, DC

SELECTED CONFERENCE PRESENTATIONS

Schott RK, M Woolfolk, K Thomas, E Loew, J Streicher, D Gower, M Fujita, R Bell. 2019. Evolution of visual pigments and opsin genes in frogs with distinct life histories. Evolution Conference 2019. Providence, RI.
Schott RK, Belinda SW Chang. 2018. Evolution and Molecular Mechanisms of Photoreceptor Transmutation. II Joint Congress on Evolutionary Biology. Montpellier, France.
Schott RK, Belinda SW Chang. 2018. Evolution and Molecular Mechanisms of Photoreceptor Transmutation. Society for Molecular Biology and Evolution Meeting 2018. Yokohama, Japan.
Schott RK and BSW Chang. 2017. Photoreceptor transmutation in snakes and geckos. Evolution Conference 2017. Portland, OR.
Schott RK, A Van Nynatten, DC Card, TA Castoe, BSW Chang. 2017. Transcriptome sequencing reveals divergent selective pressures on snake visual transduction genes associated with rod-cone transmutation. Evolution Conference 2017. Portland, OR.

- Schott RK**, D Gow, BSW Chang. 2016. BlastPhyMe: A Toolkit for Rapid Generation and Analysis of Protein-Coding Sequence Datasets. Evolution Conference 2016. Austin, TX.
- Schott RK**, B Panesar, BSW Chang. 2016. Targeted hybrid enrichment of complete coding regions across divergent species. Evolution Conference 2016. Austin, TX.
- Schott RK**, D Gow, BSW Chang. 2016. RSAT: A toolkit for rapid generation and analysis of protein-coding sequence datasets. Great Lakes Bioinformatics Conference. Toronto, ON.
- Schott RK**, C Yang, N Bhattacharyya, N Chan, M Xu, ER Loew, JM Morrow, V Tropepe, J Müller, BSW Chang. 2014. Blue-shifted rhodopsin expressed in transmuted cones of the diurnal colubrid snake *Thamnophis proximus*. Society for Molecular Biology and Evolution Meeting 2014. San Juan, Puerto Rico.
- Schott RK**, F Hauser, S Refvik, H López-Fernández, BSW Chang. 2013. Molecular evolution of rhodopsin in lake and riverine cichlids. Society for Molecular Biology and Evolution Meeting 2013. Chicago, IL.
- Schott RK**, B. Darren, BSW Chang. 2012 Molecular evolution of reptilian visual pigments. First Joint Congress on Evolutionary Biology. Ottawa, ON.

REFERENCES

Belinda SW Chang, PhD (PhD advisor)

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Rayna C Bell, PhD (Postdoctoral advisor)

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Todd A Castoe, PhD (Research collaborator)

Associate Professor, Department of Biology

Associate Director, North Texas Genome Center

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David Gower, PhD (Research collaborator)

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