BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Niles, Jacquin C.	Assistant Professor of Biological Engineering
eRA COMMONS USER NAME (credential, e.g., agency login) jcniles	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Massachusetts Institute of Technology	S.B.	1994	Chemistry
Massachusetts Institute of Technology	Ph.D.	2001	Toxicology
Harvard Medical School	M.D.	2002	Medicine
University of California, Berkeley	Postdoc	2002-2007	Chemistry

A. Personal Statement

One area of interest in my lab emphasizes developing broadly applicable strategies for controlling the fate of RNA in cells, with a specific focus on applying these to study malaria parasite biology. We use a combination of *in vitro* RNA selection approaches and genetically tractable model organisms to discover and functionally optimize regulatory RNA elements that serve as genetically-encoded “access” points to the transcriptome. We have recently developed a platform technology based on a compact protein-RNA interaction module that can be directly controlled using cell-permeable chemical inducers. Through RNA and protein engineering strategies, we are able to functionally tune this system to achieve direct control over RNA translation and subcellular localization, for example. We believe this is an adaptable system that can be integrated with endogenous RNA regulatory mechanisms to robustly achieve user-specified functions, and that it is sufficiently versatile to be useful in multiple organisms. In this light, we have demonstrated using this system in the human malarial pathogen, *Plasmodium falciparum*, to achieve robust inducible gene expression, which remains an outstanding challenge when studying biology in this parasite. Towards our long-term goal of applying this technology to better understand gene function and identify potential drug targets, we have systematically defined the technical requirements for efficiently and routinely implementing this approach in *P. falciparum*.

B. Positions and Honors

Professional Experience

1993	NSF Research Experiences for Undergraduates Student Research Assistant, Department of Chemistry, University of California, Irvine (*Advisor*: Dr. Fraser A. Armstrong)
1994-2002	NIH Predoctoral Fellow, Harvard Medical School
1996-2001	Doctoral student, Department of Biological Engineering, Massachusetts Institute of Technology (*Advisor*: Dr. Steven R. Tannenbaum)
2002-2007	NIH Postdoctoral Research Fellow, Department of Chemistry, University of California, Berkeley (*Advisor*: Dr. Michael A. Marletta)
2007	Visiting Scientist, Department of Biological Engineering, Massachusetts Institute of Technology
2008-present	Assistant Professor, Department of Biological Engineering, Massachusetts Institute of Technology
2008-present	Member, Center for Environmental Health Sciences
2009-present	Affiliate Member, Singapore-MIT Alliance for Research and Technology
2010-present	Co-Director Biological Engineering Research Experience for Undergraduates Program

Honors and Awards

1992-1994	MIT Office for the Dean of Student Affairs Academic Achievement Award
1994	American Institutes of Chemists Award

1994 American Chemical Society Alpha Chi Sigma Award
1994 MIT Department of Chemistry Merck Index Award
1994-1996 DuPont-Merck Research Fellow
1994-2002 National Institutes of Health Predoctoral Fellowship for Minorities
2004 UNCF-Pfizer Postdoctoral Fellowship (declined award)
2004-2007 National Institutes of Health Ruth L. Kirschstein Postdoctoral Fellowship
2008- Pfizer-Laubach Career Development Chair
2009 Jeptha H. and Emily V. Wade Award
2010 NIH Director's New Innovator Award
2011 James H. Ferry Jr. Fund for Innovation Award

C. Selected Peer-reviewed Publications

1. Butt, J.N., **Niles, J**, Armstrong, F.A., Breton, J. and Thomson, A.J.; Formation and properties of a stable "high potential" copper–iron–sulphur cluster in ferredoxin; *Nature Structure Biology*; **1994**; 1(7), 427–432.
2. Burney, S., Caulfield, J.L., **Niles, J.C.**, Wishnok, J.S. and Tannenbaum, S.R.; The chemistry of DNA damage from nitric oxide and peroxynitrite; *Mutation Research*; **1999**; 424, 37–49.
3. Tretyakova, N. Yu, **Niles, J.C.**, Burney, S., Wishnok, J.S. and Tannenbaum, S.R.; Peroxynitrite–induced reactions of synthetic oligonucleotides containing 8–oxoguanine; *Chemical Research in Toxicology*; **1999**; 12(5), 459–466.
4. Burney, S, **Niles, J.C.**, Wishnok, J.S., Dedon, P.C. and Tannenbaum, S.R.; DNA damage in deoxynucleosides and oligonucleotides treated with peroxynitrite; *Chemical Research in Toxicology*; **1999**; 12(6), 513–520.
5. **Niles, J.C.**, Burney, S., Singh, S.P., Wishnok, J.S., and Tannenbaum, S.R.; Peroxynitrite reaction products of 3′,5′–di–*O*–acetyl–8–oxo–2′–deoxyguanosine; *Proceedings of the National Academy of Sciences, USA*; **1999**; 96(21), 11729–11734.
6. **Niles, J.C.**, Wishnok, J.S., and Tannenbaum, S.R.; A novel nitration product formed during the reaction of peroxynitrite with 2,3,5–tri–*O*–acetyl–8–oxoguanosine: *N*–nitro,N′–[1–(2,3,5–tri–*O*–acetyl–β–D–*erythro*–pentofuranosyl)–2,4–dioxo–imidazolidin–5–ylidene]guanidine, *Chemical Research in Toxicology*; **2000**; 13(5), 390–396.
7. **Niles, J.C.**, Wishnok, J.S., and Tannenbaum, S.R.; Spiroiminodihydantoin is the major product of the 8–oxo–7,8–dihydroguanosine reaction with peroxynitrite in the presence of thiols and guanosine photooxidation by methylene blue; *Organic Letters*; **2001**; 3(7), 963–966.
8. **Niles, J.C.**, Wishnok, J.S., and Tannenbaum, S.R.; A novel nitroimidazole compound formed during the reaction of peroxynitrite with 2′,3′,5′–tri–*O*–acetyl–guanosine; *Journal of the American Chemical Society*; **2001**; 123(49), 12147–12151.
9. Yu, H., Niles, J.C., Wishnok, J.S. and Tannenbaum, S.R.; Spirodihydantoin is a minor product of 5-hydroxyisourate in urate oxidation; *Organic Letters*; **2004**; 6(19):3417-3420.
10. **Niles, J.C.,** Wishnok, J.S., and Tannenbaum, S.R.; Mass Spectrometric identification of 4–hydroxy–2,5–dioxo–imidazolidine–4–carboxylic acid during oxidation of 8–oxoguanosine by peroxynitrite and $KHSO_5/CoCl_2$; *Chemical Research in Toxicology*; **2004**: 17(11), 1501–1509.
11. **Niles, J.C.,** Wishnok, J.S., and Tannenbaum, S.R.; Spiroiminodihydantoin and guanidinohydantoin are the dominant products of 8–oxoguanosine oxidation at low fluxes of peroxynitrite: Mechanistic studies with ^{18}O; *Chemical Research in Toxicology*; **2004**: 17(11), 1510–1519.
12. Henderson, P.T., Neeley, W.L., Delaney, J.C., Gu, F., **Niles, J.C.**, Tannenbaum, S.R., and Essigmann, J.M.; Urea lesion formation in DNA produced by 7,8–dihydro–8–oxoguanine oxidation and hydrolysis: a novel pathway to a potent source of point mutations; *Chemical Research in Toxicology;* **2005**; 18(1), 12–18.
13. **Niles, J.C.**, Wishnok, J.S. and Tannenbaum, S.R.; Peroxynitrite–induced oxidation and nitration products of guanine and 8–oxoguanine: Structures and mechanisms of product formation; *Nitric Oxide*; **2006**; 14, 109–121.
14. **Niles, J.C.** and Marletta, M.A.; Utilizing RNA aptamers to probe a physiologically important heme–regulated cellular network; *ACS Chemical Biology;* **2006**: 1(8), 515–524.

15. **Niles, J.C.**, DeRisi, J.L. and Marletta, M.A.; Inhibiting *Plasmodium falciparum* growth and heme detoxification pathway using heme-binding DNA aptamers; *Proceedings of the National Academy of Sciences, USA*; **2009**; 106(32), 13266-13271.
16. Belmont, B.J. and **Niles, J.C.**; Engineering a direct and inducible protein-RNA interaction to regulate RNA biology; *ACS Chemical Biology*; **2010**; 5(9), 851-861.
17. Bow, H.*, Pivkin I.V.*, Diez-Silva, M.*, Goldfless, S.J., Dao, M., **Niles J.C.**, Suresh, S. and Han, J.; A microfabricated deformability-based flow cytometer with application to malaria; *Lab on a Chip*; **2011**; 11(6), 1065-1073.
18. Kang, J.W., Lue, N., Kong, C.R., Barman, I., Dingari, N.C., Goldfless, S.J., **Niles, J.C.**, Dasari, R.R., Feld M.S.; Combined confocal Raman and quantitative phase microscopy system for biomedical diagnosis; *Biomedical Optics Express*; **2011**; 2(9):2484-2492.
19. Goldfless, S.J.*, Belmont, B.J.*, Liu, J.F., de Paz, A.M. and **Niles, J.C.**; Direct and specific chemical control of eukaryotic translation with a synthetic RNA-protein interaction; *Nucleic Acids Research;* **2012***;* 40(9):e64. * = Equal contribution.
20. **Niles, J.C.**; Malarial parasites accumulate labile zinc pools; *Chemistry and Biology*; **2012**; 19(6):660-661.
21. Zhao, W., Dauwels, J., **Niles, J.C.** and Cao, J; Computational synchronization of microarray data with application to *Plasmodium falciparum*; *Proteome Science*; **2012**; 10 Suppl 1:S10.
22. Belmont, B.J. and **Niles, J.C.**; Inducible control of subcellular RNA localization using a synthetic protein-RNA aptamer interaction; *PLOS ONE*; **2012** In Press.