

ASHA RESEARCH EDUCATION PROGRAM MODIFIED NIH BIOSKETCH

The following modifications have been made to the [NIH Biographical Sketch Format Page for due dates on/after January 25, 2022 - Instructions and Samples](#):

- Includes only those instructions relevant to Research Grant (R series) Biosketches
- Sample is representative of an early-career stage researcher applying for a Research Grant (R series)
- Personal Statement justifies why you are well-suited to participate in the program to which you are applying
- Includes sections that allow inclusion of additional publications and research funding submissions

Modifications are highlighted below.

A. Personal Statement

Briefly describe why you are well-suited to participate in the program to which you are applying. To that end, state how your experience and qualifications will enable you to successfully apply the knowledge gained from the program and how you will use that knowledge to advance your career. The relevant factors may include: aspects of your training; your previous experimental work on this specific topic or related topics; your technical expertise; your collaborators or scientific environment; and/or your past performance in this or related fields, including ongoing and completed research projects from the past three years that you want to draw attention to (previously captured under Section D. Research Support). Include only research support for which you serve as PI, co-PI, or co-Investigator. Any grant that provided you with financial support but for which you served a role other than PI, co-PI, or co-Investigator should be included in Section B.

You may cite up to four publications or research products that highlight your experience and qualifications for this project. Research products can include, but are not limited to, audio or video products; conference proceedings such as meeting abstracts, posters or other presentations; patents; data and research materials; databases; educational aids or curricula; instruments or equipment; models; protocols; and software or netware. Use of hyperlinks and URLs to cite these items is not allowed.

You are allowed to cite interim research products. Note: interim research products have specific citation requirements. See related [Frequently Asked Questions](#) for more information.

Note the following additional instructions:

- If you wish to explain factors that affected your past productivity, such as family care responsibilities, illness, disability, or military service, you may address them in this “A. Personal Statement” section.
- Indicate whether you have published or created research products under another name.
- You may mention specific contributions to science that are not included in Section C. Do not present or expand on materials that should be described in other sections of this Biosketch or application.
- Figures, tables and graphics are not allowed.

B. Positions, Scientific Appointments, and Honors

List in reverse chronological order all current positions and scientific appointments both domestic and foreign, including affiliations with foreign entities or governments. This includes titled academic, professional, or institutional appointments whether or not remuneration is received, and whether full-time, part-time, or voluntary (including adjunct, visiting, or honorary).

List any relevant academic and professional achievements and honors. In particular:

- Students, postdoctorates, and junior faculty should include scholarships, traineeships, fellowships, development awards, academic awards, loan repayment awards, and grants that provided you with financial support but for which you served a role other than PI, co-PI, or co-Investigator (e.g. Research Assistant, Postdoctoral Fellow on an Institutional Training Grant), as applicable.
- Clinicians should include information on any clinical licensures and specialty board certifications that they have achieved.

C. Contributions to Science

Briefly describe up to five of your most significant contributions to science. The description of each contribution should be no longer than one half page, including citations.

While all applicants may describe up to five contributions, graduate students and postdoctorates may wish to consider highlighting two or three they consider most significant.

For each contribution, indicate the following:

- the historical background that frames the scientific problem;
- the central finding(s);
- the influence of the finding(s) on the progress of science or the application of those finding(s) to health or technology; and
- your specific role in the described work.
- Figures, tables, or graphics are not allowed.

For each contribution, you may cite up to four publications or research products that are relevant to the contribution. If you are not the author of the product, indicate what your role or contribution was. Note that while you may mention manuscripts that have not yet been accepted for publication as part of your contribution, you may cite only published papers to support each contribution. Research products can include audio or video products (see the [NIH Grants Policy Statement, Section 2.3.7.7: Post-Submission Grant Application Materials](#)); conference proceedings such as meeting abstracts, posters or other presentations; patents; data and research materials; databases; educational aids or curricula; instruments or equipment; models; protocols; and software or netware. Use of hyperlinks and URLs to cite these items is not allowed. You are allowed to cite interim research products. Note: interim research products have specific citation requirements. See related [Frequently Asked Questions](#) for more information. **SIG Perspective articles published since 2018 are peer-reviewed and may be cited here; those published before 2018 were not peer-reviewed and should be included in the "Other Publications" section described below.**

- Add a subsection entitled, "**Other Publications**" to include
 - manuscripts currently under peer review (include the journal name(s); do NOT include any papers that are in preparation but not yet submitted
 - non-peer reviewed publications (e.g., the ASHA Leader or SIG Perspectives prior to 2018)
- For each contribution, limit the total number of citations to four.

You may provide a URL to a full list of your published work. This URL must be to a Federal Government website (a .gov suffix). NIH recommends using [My Bibliography](#). Providing a URL to a list of published work is not required.

Descriptions of contributions may include a mention of research products under development, such as manuscripts that have not yet been accepted for publication. These contributions do not have to be related to the project proposed in this application.

Add the following sections:

D. Additional Information: Extramural Research Support Currently Under Review

List any extramural grants you have submitted as PI, co-PI, or co-Investigator that are currently under review.

E. Additional Information: Extramural Research Support Currently Not Funded

List any extramural grants you have submitted as PI, co-PI, or co-Investigator that were not funded.

F. Additional Information: Intramural Research Support

List any research funds that have been awarded to you as PI, co-PI, or co-Investigator from your home institution (e.g., University seed money).

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Hayes, Susan

eRA COMMONS USER NAME (credential, e.g., agency login): HayesS

POSITION TITLE: Postdoctoral Fellow

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

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Wake Forest University	B.S.	05/2013	Engineering
Georgetown University	Ph.D.	09/2019	Molecular Biology
Michigan State University	Postdoctoral Fellow	Present	Bioinformatics/Immunology

A. Personal Statement

The goal of the *Lesson for Success* program is to provide intensive training to promising, emerging scientists to help them successfully secure grant funding, and develop and manage an independent program of research. I have the training, expertise, and motivation necessary to successfully apply the knowledge gained from the *Lessons for Success* program to advance my academic research career. My long term research interests involve the development of a comprehensive understanding of key developmental pathways and how alterations in gene expression contribute to human disease. My academic training and research experience have provided me with an excellent background in multiple biological disciplines including molecular biology, microbiology, biochemistry, and genetics. As an undergraduate, I conducted research with Dr. Xavier Factor on the mechanisms of action of a new class of antibiotics. As a predoctoral student with Dr. Tanti Auguri, my research focused on the regulation of transcription in yeast, and I gained expertise in the isolation and biochemical characterization of transcription complexes. I developed a novel protocol for the purification for components of large transcription complexes. I was first author of the initial description of the Most Novel Complex. A subsequent first author publication challenged a key paradigm of transcription elongation and was a featured article in a major journal. During my undergraduate and graduate careers, I received several academic and teaching awards. For my postdoctoral training, I successfully secured F32 funding to support building on my previous training in transcriptional controls by moving into a mammalian system that has allowed me to address additional questions regarding the regulation of differentiation and development. During my second postdoctoral year in Dr. Creative's lab my father had a severe stroke that eventually ended his life. I was out of the lab for six months dealing with my father's incapacitating illness and end-of-life issues. This hiatus in training reduced my scientific productivity. Participation in *Lessons for Success* will enhance my ability to transition from securing postdoctoral funding to securing ECR R21 funding. Achieving this next level of research success will assist me in becoming an independent investigator studying developmental diseases in man, as I seek to secure a faculty position and ultimately gain tenure and serve as a teacher and mentor to the next generation of academic researchers.

Ongoing and recently completed projects that I would like to highlight include:

The Role of Drosophila melanogaster in Human Immune Response

The goal of this study is to determine the link between mutations arising in stress response proteins and the development of various autoimmune diseases in humans.

Role: PI

Citations:

1. **Hayes S**, Schneider K, Chen M, Auguri T. Rapid isolation and characterization of a novel transcription complex in *Saccharomyces cerevisiae* and its role in transcription elongation. *Journal of Cell Biology*. 2016; 128:770.
2. **Hayes S**, Auguri T. A tandem affinity purification tag approach allows for isolation of interacting proteins in *Saccharomyces cerevisiae*. *Proceedings of the National Academy of Sciences of the United States of America*. 2019; 98:151.
3. Yao M, Dionne CF, **Hayes S**, Murray GC. Up-regulation of *Drosophila* innate immunity genes in response to stress. *Science (New York, N.Y.)*. 2020; 304:1754.
4. **Hayes S**, Cescaloo Q, Murray GC. Structural analysis of *Drosophila* Rtc. *Nature*. Forthcoming 2021.

B. Positions, Scientific Appointments, and Honors**Positions and Scientific Appointments**

2019-present Postdoctoral Fellow, Michigan State University
 2015-2018 Predoctoral Fellowship for Minorities, Ford Foundation
 2013-2019 Graduate Research Assistant, Georgetown University
 2012-present Member, National Society for Bioinformatics and Biotechnology
 2010-present Member, Association for Women in Science
 2010-2012 Engineer, The IBeam Group Program
 2009-present Member, Sigma Xi

Honors

2013 B.S. awarded with high honors, Wake Forest University
 2013 Paula F. Laufenberg award for best senior project in the Department of Engineering, Wake Forest University
 2013 STAR award for public service in engineering, The IBeam Group
 2010-2011 Scholarship, National Merit Scholarship Program
 2009-2011 Scholarship, Daughters of Hawaii Society

C. Contributions to Science

I. Early Career: My early career contributions were focused on applying my knowledge of structural engineering to improving the design and integrity of tensile structures. More specifically, I worked with a team of engineers at the IBeam Group to develop concrete with a higher tensile strength that could be utilized in large structures such as suspension bridges. My particular role in the project was to identify candidate polymers, determine the ultimate tensile strength of these polymers, and make recommendations as to which polymer would afford concrete the most structural integrity under various stresses.

a. **Hayes, S.** and Janessa, A.J. Redesigning the Golden Gate bridge. National Undergraduate Symposium on Science and Engineering; 2011; Baltimore, MD.

b. Lorentson, C., **Hayes, S.**, Sauer, N., and Mehta, S. Use of high-tensile concrete in cantilevered structures. J. Applied Engineering. 2012; 63:413.

Other Publications (currently under peer review or non-peer reviewed)

n/a

II. Graduate Career: My graduate research contributions focused on transcriptional gene regulation in *Saccharomyces cerevisiae*. Results from my research were highly relevant as they provided new details into the workings of complex biological systems, and allowed for further extrapolations into the development of certain diseases and their progression. I originally developed a novel protocol for the purification for components of large protein complexes. A subsequent publication, in which I isolated and characterized a long sought after transcription complex, challenged a key paradigm of transcription elongation and was a featured article in a major journal.

- a. **Hayes S**, Schneider K, Chen M, Auguri T. Rapid isolation and characterization of a novel transcription complex in *Saccharomyces cerevisiae* and its role in transcription elongation. Journal of Cell Biology. 2016; 128:770.
- b. **Hayes S**, Auguri T. A tandem affinity purification tag approach allows for isolation of interacting proteins in *Saccharomyces cerevisiae*. Yeast Genetics and Molecular Biology Meeting; 2017 September; Seattle, WA.
- c. **Hayes S**, Auguri T. A tandem affinity purification tag approach allows for isolation of interacting proteins in *Saccharomyces cerevisiae*. Proceedings of the National Academy of Sciences of the United States of America. 2019; 98:151.

Other Publications (currently under peer review or non-peer reviewed)

- a. **Hayes, S.**, Schneider K, Chen M, Auguri T. Rapid isolation and characterization of the most novel transcription complex in *Saccharomyces cerevisiae* and its role in transcription elongation. SIG 20 Perspectives on Genetics. 2015; 21:127.

III. Postdoctoral Career: As a postdoctoral fellow, my research has provided a compelling link between mutations arising in stress response proteins and the development of various autoimmune diseases in humans. Previous studies have shown dysregulation in the innate immune response lead to autoimmune diseases in humans. A few Rtc homologues have now been identified in humans and appear to play a role in the regulation of genes in the innate immune response. My research is focused on the transcriptional regulator Rtc from *Drosophila melanogaster*.

- a. Yao M, Dionne CF, **Hayes S**, Murray GC. Up-regulation of *Drosophila* innate immunity genes in response to stress. Science. 2020; 304:1754.
- b. **Hayes S**, Cescaloo Q, Murray GC. Structural analysis of *Drosophila* Rtc. Nature. Forthcoming 2021.

Other Publications (currently under peer review or non-peer reviewed)

- a. **Hayes S**, Murray GC. Stress, flies, and videotape: the *Drosophila* stress response. The ASHA Leader. 2020; 5:32.
- b. **Hayes S**, Yager LN, Murray GC. Rtc is an essential component of the *Drosophila* innate immune response. Genetics. (submitted).

Complete List of Published Work in My Bibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/1VgYzYESn3Nke9/bibliography/public/>

D. Additional Information: Extramural Research Support Currently Under Review

n/a

E. Additional Information: Extramural Research Support Not Funded

F31 NS942366

Hayes (PI)

09/01/17

Transcriptional gene regulation in *Saccharomyces cerevisiae*

The goal of this study was to develop a novel protocol for the purification for components of large protein complexes.

Role: PI

F. Additional Information: Intramural Research Support

Postdoctoral Fellow Resources Grant, Michigan State University 08/15/20-08/14/22

The Role of Rtc in *Drosophila melanogaster*

The goal of this project was to perfect a technique for identifying mutations affecting Rtc.

Role: PI