Mika Lambert - UC Santa Cruz - Statement of Purpose

I intend to receive a Ph.D. in astronomy at UC Santa Cruz in the field of galaxy evolution. Upon earning my Ph.D., I plan to continue my career in academia as a postdoctoral researcher working on similar research and pursuing a professor position. Due to the impact previous physics professors have made on my education, when I began my undergraduate career, my initial academic aspiration was to teach university-level physics and astronomy. Now, I want to pursue a profession that will allow me the freedom to dive into questions I have about the universe through research while also teaching astronomy classes.

In my third year as an undergraduate, I accepted a preceptor position for the physics introductory mechanics class (PHYS141). I was grateful for the opportunity because this was a way to develop my teaching and science communication skills. As a preceptor, I led two discussion sections per week of about 30 students with a graduate student. The graduate student and I would give a short explanation of the topic, the students then worked together to complete a tutorial on the current lecture material, and the graduate student and I answered any questions in an open-ended manner. Being a preceptor for this introductory class, after taking my upper-division physics courses, instilled a new-found appreciation for the foundation introductory physics classes laid for me. This experience gave me the reassurance that I love to teach science, and I want to continue to do so in my career.

Another formative part of my undergraduate career was exploring the unanswered questions in astronomy through research. My curiosity propelled my decision to take on two research projects in different fields to explore my research interests. Upon entering university, I knew there was a wide range of topics to study in astronomy, so I wanted to have some exposure to the fields I found most intriguing, then I would be able to narrow down my interests once I enter your graduate program.

I secured a research role under Dr. Dennis Zaritsky during my second year to study ultra-diffuse galaxies (UDGs). Due to their extreme mass-to-light ratio, UDGs are important probes in galaxy evolution. For the past two years, I have been developing analysis software in python to systematically measure the frequency of nuclear star clusters (NSCs) in UDG candidates in the Systematically Measuring Ultra-Diffuse Galaxies (SMUDGes) catalog. In order to detect the potential NSCs, I constructed multi-component models of the galaxies using `GALFIT`. I created masks and point source function (PSF) profiles to increase the precision of our results and made simulated point sources to determine the magnitude limit of detecting a potential NSC in UDG candidates. I created a catalog of 16 UDGs with potential NSCs each with an effective radius meeting the defined criteria for UDGs, and I analyzed the relation between the magnitude of the point source, the magnitude of the galaxy, the color, and the radial offset between the point source and the center of the galaxy. My first-author paper will be submitted to the Astrophysical Journal for review in Spring 2023, and I will present my findings via iPoster at the 241st AAS conference. Further avenues I would like to explore in the subject would be to determine the different properties of these galaxies seen in different wavelengths and to explore the spectra in NIR or X-ray to determine dust or star-forming regions in the galaxies.

The galactic population of these types of galaxies at high redshift would also be exciting to research in the future.

In my third year, I joined Dr. Chad Bender and his collaborators at Penn State on TESS exoplanet follow-up characterization. I specifically worked on a binary star system, labeled TOI-5375, with an early M-type host star and a companion initially identified to be a planet candidate. I used the radial velocity (RV) data procured from the Habitable-zone Planet Finder (HPF) and ground-based transit data from the Red Buttes Observatory (RBO) to investigate the orbital and physical parameters of the companion using a package called `exoplanet` which utilizes a Hamiltonian Monte Carlo Markov Chain to find the best fit. I used a secondary eclipse function and a Keplerian function to model the transit data and RV data respectively. I concluded that the host star has a companion that is a very low mass star (VLMS) near the hydrogen burning mass limit (0.08 M_sun) with an orbital period of 1.72 days and an estimated age of 400 Myrs. This system provides data to improve stellar evolution models with physically derived parameters of an eclipsing binary system. My first-author paper has been submitted to the Astronomical Journal for review.

In my undergraduate years, my curiosity for astronomy developed into a motivation to pursue a career based on research and teaching. With a reputation for superb research and academics, UC Santa Cruz is a place that aligns with my values, has a tight-knit community among students, and strives towards an inclusive and diverse environment. As I am confident in my intention to complete a Ph.D. in astronomy in galactic evolution studies, I believe UC Santa Cruz will enhance my skill set through its holistic program dedicated to fostering an environment to set up future astronomers for success through rigorous courses and supportive faculty. With the distinguished galaxy researchers here, I am open to working with many professors at UC Santa Cruz including Dr. Puragra GuhaThakurta's work on dwarf galaxy populations at high redshifts and his work on surveying the Virgo Cluster because I find that topic aligns with my interests and my previous experience with UDGs will provide background knowledge on the subject. I chatted with him via zoom, and he demonstrated UC Santa Cruz's commitment to compassion and trust towards its students. I would be grateful for his mentorship for my growth as a researcher and academic career. I would also be interested in working with Dr. Kevin Bundy and his work on stellar populations in galaxies. Due to my interest in observational astronomy, UC Santa Cruz's access to the Kick and Keck Observatories is also appealing. Furthermore, as I plan on continuing to participate in outreach, I would also enjoy partaking in the "Ask an Astronomer" program and Astronomy Club. For all these reasons, I hope to be a part of the graduate program at UC Santa Cruz.

Mika Lambert - UT Austin - Personal Statement

I intend to receive a Ph.D. in astronomy at the University of Texas, Austin (UT Austin) in the field of exoplanets. Upon earning my Ph.D., I plan to continue my career in academia as a postdoctoral researcher working on similar research and pursuing a professor position. Due to the impact previous physics professors have made on my education, teaching university-level physics and astronomy was my initial academic aspiration when I began my undergraduate career. Now, I want to pursue a profession that will allow me the freedom to dive into questions I have about the universe through research while also teaching astronomy classes.

I have been greatly involved in the University of Arizona Astronomy Club since joining my first semester. I was elected the Vice President last year, and President this year, leading the club of over 100 active members. Along with increasing the annual funding for the club from $100 to $600, working with the department administrators to organize an out-of-state summer trip, and conducting telescope training events for members, I lead the diversity, equity, and inclusion initiatives of the Astronomy Club. I am a queer woman of Japanese descent, and I view myself as a role model for the incoming members to show that there can be someone who is similar to them in a leadership position. While President, the officers and I implemented a code of conduct as well as increased the amount of DEI presentations during our weekly meetings. Furthermore, most outreach in which the club participates is volunteer telescope observation events at public elementary schools where students normally do not have the opportunity to explore space through a telescope. Listening to their questions and imaginative explanations for astronomical phenomena will always reignite that spark in me to pursue teaching and science communication.

In my third year as an undergraduate, I accepted a preceptor position for the university's physics introductory mechanics class (PHYS141). I was grateful for the opportunity because this was a way to develop my teaching and science communication skills. As a preceptor, I led two discussion sections per week of about 30 students with a graduate student, and the students would work together to complete a tutorial on the current lecture material. The graduate student and I would give a short explanation of the topic and answer questions in an open-ended manner. Being a preceptor for this introductory class, after taking my upper-division physics courses, instilled a new-found appreciation for the foundation introductory physics classes laid for me. This experience gave me the reassurance that I love to teach science, and I want to continue to do so in my career.

Being mixed race, I navigate life with a unique lens of trying to preserve my heritage while presenting white. This includes acquiring a minor in Japanese with the goal to hold conversations with my mother and grandparents. I intend to use my privilege to further educate people on areas to improve accessibility in astronomy and uplift the voices of BIPOC astronomers. Expanding on my outreach initiatives in the future, I plan to continue on this path of lowering the barriers to entry to astronomy using the knowledge I've gained from my outreach experience.

Another formative part of my undergraduate career was exploring the unanswered questions in astronomy through research. My decision to take on two research projects in different fields was propelled by my curiosity to explore my research interests. Upon entering university, I knew there was a wide range of topics to study in astronomy, so I wanted to have some exposure to the fields I found most intriguing, then I would be able to narrow down my interests once I enter a graduate program.

I secured a research role under Dr. Dennis Zaritsky during my second year to study ultra-diffuse galaxies (UDGs). Due to their extreme mass-to-light ratio, UDGs are important

probes in galaxy evolution. For the past two years, I have been developing analysis software in python to systematically measure the frequency of nuclear star clusters (NSCs) in UDG candidates in the Systematically Measuring Ultra-Diffuse Galaxies (SMUDGes) catalog. In order to detect the potential NSCs, I constructed multi-component models of the galaxies using `GALFIT`. I created masks and point source function (PSF) profiles to increase the precision of our results and made simulated point sources to determine the magnitude limit of detecting a potential NSC in UDG candidates. Once I created a catalog of UDGs with potential NSCs, I analyzed the relation between the different properties of the galaxies including magnitude, color, distance, and environment. My first-author paper will be submitted to the Astrophysical Journal for review in Spring 2023, and I will present my findings at the 241st AAS conference.

In my third year, I joined Dr. Bender and his collaborators at Penn State on TESS exoplanet follow-up characterization. I specifically worked on a binary star system, labeled TOI-5375, with an early M-type host star and a companion initially identified to be a planet candidate. I used the radial velocity (RV) data procured from the Habitable-zone Planet Finder (HPF) and ground-based transit data from the Red Buttes Observatory (RBO) to investigate the orbital and physical parameters of the companion using a package called `exoplanet` which utilizes a Hamiltonian Monte Carlo Markov Chain to find the best fit. I used a secondary eclipse function and a Keplerian function to model the transit data and RV data respectively. I concluded that the host star has a companion that is a very low mass star (VLMS) near the hydrogen burning mass limit (0.08 M_sun) with an orbital period of 1.72 days and an estimated age of ~400 Myrs. This system provides data to improve stellar evolution models with physically derived parameters of an eclipsing binary system. My first-author paper has been submitted to the Astronomical Journal for review. Throughout my undergraduate research, I have gained an appreciation for the art of formulating the right questions, and I see graduate school as a pursuit of my own inquiries.

In my undergraduate years, my curiosity for astronomy developed into a motivation to pursue a career based on research and teaching. With a reputation for superb research and academics, UT Austin is a place that aligns with my values and has a tight-knit community among students. As I intend to complete a Ph.D. in astronomy in exoplanet studies, I believe UT Austin will enhance my skill set through its holistic program dedicated to fostering an environment to set up future astronomers for success through rigorous courses and supportive faculty. With the distinguished exoplanet researchers here, I am open to working with many professors at this university including Adam Kraus' work on identifying low-mass objects because that aligns with my interests, and I would be a valuable asset to his group due to my experience in the topic. I would be grateful for his mentorship for my growth as a researcher and academic career. For all these reasons, I hope to be a part of the graduate program at UT Austin.

Mika Lambert - Cornell - Statement of Purpose

I intend to receive a Ph.D. in astronomy at Cornell in the field of galaxy evolution. Upon earning my Ph.D., I plan to continue my career in academia as a postdoctoral researcher working on similar research and pursuing a professor position. Due to the impact previous physics professors have made on my education, teaching university-level physics and astronomy was my initial academic aspiration when I began my undergraduate career. Now, I want to pursue a profession that will allow me the freedom to dive into questions I have about the universe through research while also teaching astronomy classes.

In my third year as an undergraduate, I accepted a preceptor position for the physics introductory mechanics class (PHYS141). I was grateful for the opportunity because this was a way to develop my teaching and science communication skills. As a preceptor, I led two discussion sections per week of about 30 students with a graduate student, and the students would work together to complete a tutorial on the current lecture material. The graduate student and I would give a short explanation of the topic and answer questions in an open-ended manner. Being a preceptor for this introductory class, after taking my upper-division physics courses, instilled a new-found appreciation for the foundation introductory physics classes laid for me. This experience gave me the reassurance that I love to teach science, and I want to continue to do so in my career.

Another formative part of my undergraduate career was exploring the unanswered questions in astronomy through research. My decision to take on two research projects in different fields was propelled by my curiosity to explore my research interests. Upon entering university, I knew there was a wide range of topics to study in astronomy, so I wanted to have some exposure to the fields I found most intriguing, then I would be able to narrow down my interests once I enter a graduate program.

I secured a research role under Dr. Dennis Zaritsky during my second year to study ultra-diffuse galaxies (UDGs). Due to their extreme mass-to-light ratio, UDGs are important probes in galaxy evolution. For the past two years, I have been developing analysis software in python to systematically measure the frequency of nuclear star clusters (NSCs) in UDG candidates in the Systematically Measuring Ultra-Diffuse Galaxies (SMUDGes) catalog. In order to detect the potential NSCs, I constructed multi-component models of the galaxies using `GALFIT`. I created masks and point source function (PSF) profiles to increase the precision of our results and made simulated point sources to determine the magnitude limit of detecting a potential NSC in UDG candidates. Once I created a catalog of UDGs with potential NSCs, I analyzed the relationship between the different properties of the galaxies and their environment. My first-author paper will be submitted to the Astrophysical Journal for review in Spring 2023, and I will present my findings at the 241st AAS conference. Further avenues to explore in the subject would be to determine the different properties of these galaxies seen in different wavelengths and to explore the spectra in NIR or X-ray to determine dust or star-forming regions in the galaxies. The galactic population of these types of galaxies at high redshift would also be exciting to research in the future.

In my third year, I joined Dr. Bender and his collaborators at Penn State on TESS exoplanet follow-up characterization. I specifically worked on a binary star system, labeled TOI-5375, with an early M-type host star and a companion initially identified to be a planet candidate. I used the radial velocity (RV) data procured from the Habitable-zone Planet Finder (HPF) and ground-based transit data from the Red Buttes Observatory (RBO) to investigate the orbital and physical parameters of the companion using a package called `exoplanet` which utilizes a Hamiltonian Monte Carlo Markov Chain to find the best fit. I used a secondary eclipse

function and a Keplerian function to model the transit data and RV data respectively. I concluded that the host star has a companion that is a very low mass star (VLMS) near the hydrogen burning mass limit (0.08 M_sun) with an orbital period of 1.72 days and an estimated age of 400 Myrs. This system provides data to improve stellar evolution models with physically derived parameters of an eclipsing binary system. My first-author paper has been submitted to the Astronomical Journal for review.

In my undergraduate years, my curiosity for astronomy developed into a motivation to pursue a career based on research and teaching. With a reputation for superb research and academics, Cornell is a place that aligns with my values and has a tight-knit community among students. As I intend to complete a Ph.D. in astronomy in galactic evolution studies, I believe Cornell will enhance my skill set through its holistic program dedicated to fostering an environment to set up future astronomers for success through rigorous courses and supportive faculty. With the distinguished galaxy researchers here, I am open to working with many professors at Cornell including Dr. Martha P. Haynes' work on the influence of the environment on galaxy evolution because I find that topic aligned with my interests and previous experience with UDGs. I would be grateful for her mentorship for my growth as a researcher and academic career. I would also be interested in working with Dr. Rachel Bean and her work on galaxy clusters. As I plan on continuing to participate in outreach, I would also enjoy partaking in the "Ask an Astronomer" program at Cornell. For all these reasons, I hope to be a part of the graduate program at Cornell.

I intend to receive a Ph.D. in astronomy at UCLA in the field of galaxy evolution. Upon earning my Ph.D., I plan to continue my career in academia as a postdoctoral researcher working on similar research and pursuing a professor position. Being a professor will allow me the freedom to dive into questions I have about the universe through research while also teaching astronomy classes.

A formative part of my undergraduate career was exploring the unanswered questions in astronomy through research. I secured a research role under Dr. Dennis Zaritsky during my second year to study ultra-diffuse galaxies (UDGs). Due to their extreme mass-to-light ratio, UDGs are important probes in galaxy evolution and dark matter halos. For the past two years, I have been developing analysis software in python to systematically measure the frequency of nuclear star clusters (NSCs) in UDG candidates in the Systematically Measuring Ultra-Diffuse Galaxies (SMUDGes) catalog. In order to detect the potential NSCs, I constructed multi-component models of the galaxies using GALFIT. Once I created a catalog of UDGs with potential NSCs, I analyzed the relation between the magnitude of the point source, magnitude of the galaxy, and color of the components. My first-author paper will be submitted to the Astrophysical Journal for review in Spring 2023, and I will present my findings at the 241st AAS conference iposter session.

In my third year, I joined Dr. Bender and his collaborators at Penn State on TESS exoplanet follow-up characterization. I specifically worked on a binary star system, labeled TOI-5375, with an early M-type host star and a companion initially identified to be a planet candidate. I used the radial velocity (RV) data procured from ground-based observatories to investigate the orbital and physical parameters of the companion using a Hamiltonian Monte Carlo Markov Chain to find the best fit. We concluded that the early M dwarf has a companion that is an object near the hydrogen burning mass limit (0.08 M_sun) with an estimated age of 400 Myrs and an orbital period of 1.72 days. The goal was to increase the sample of objects within this mass range and provide data to improve stellar evolution models with physically derived parameters of an eclipsing binary system. My first-author paper has been submitted to the Astronomical Journal for review.

In my undergraduate years, my curiosity for astronomy developed into a motivation to pursue a career based on research and teaching. With a reputation for superb research and academics, UCLA is a place that aligns with my values and has a tight-knit community among students. With the distinguished galaxy researchers here, I am open to working with many professors at UCLA including Matthew Malkan or Tommaso Treu’s work on high redshift galaxies because I find that topic aligned with my interests. I would be grateful for either of their mentorship for my growth as a researcher and academic career. For all these reasons, I hope to be a part of the graduate program at UCLA.

I intend to receive a Ph.D. in astronomy at the University of Colorado, Boulder in the field of galaxy evolution. Upon earning my Ph.D., I plan to continue my career in academia as a postdoctoral researcher working on similar research and pursuing a professor position. Due to the impact previous physics professors have made on my education, teaching university-level physics and astronomy was my initial academic aspiration when I began my undergraduate career. Now, I want to pursue a profession that will allow me the freedom to dive into questions I have about the universe through research while also teaching astronomy classes.

I have been greatly involved in the University of Arizona Astronomy Club since joining my first semester. I was elected the Vice President last year, and I am the current President leading the club of over 100 active members. Along with increasing the annual funding for the club from $100 to $600, working with the department administrators to organize an out-of-state summer trip to San Diego, and conducting telescope training events for members, I lead the diversity, equity, and inclusion initiatives of the Astronomy Club. I am a queer woman of Japanese descent, and I view myself as a role model for the incoming members to show that there can be someone who is similar to them in a leadership position. While President, the officers and I implemented a code of conduct as well as increased the amount of DEI presentations during our weekly meetings. Furthermore, the majority of the outreach in which the club participates are volunteer telescope observation events at public elementary schools where students normally do not have the opportunity to explore space through a telescope. Listening to their questions and imaginative explanations for astronomical phenomena will always reignite that spark in me to pursue teaching and science communication.

In my third year as an undergraduate, I accepted a preceptor position for the physics introductory mechanics class (PHYS 141). I was grateful for the opportunity because I entered college determined to build a career in teaching astronomy and physics, so I saw this as an opportunity to develop my teaching and science communication skills. This was the first physics class I attended as a freshman, and when I returned after taking my upper-division courses, I had a new-found appreciation for the foundation this class laid for me. As a preceptor, I led two discussion sections per week of about 30 students with a graduate student where the students would work together to complete a tutorial on the current lecture material. The graduate student and I would give a short explanation of the topic and answer questions in an open-ended manner. This experience gave me the reassurance that I love to teach science, and I want to continue to do so for the rest of my life.

Being mixed race, I navigate life with a unique lens of trying to preserve my heritage while presenting white. This includes acquiring a minor in Japanese with the goal to hold conversations with my mother and grandparents. I intend to use my privilege to further educate people on areas to improve accessibility in astronomy and uplift the voices of BIPOC astronomers. Expanding on my outreach initiatives in the future, I plan to continue on this path of lowering the barriers to entry to astronomy using the knowledge I've gained from my outreach experience. I would enjoy participating in Promoting an Inclusive Community in Astronomy (PICA) to work towards building a supportive community in astronomy at CU Boulder.

Another formative part of my undergraduate career was exploring the unanswered questions in astronomy through research. My decision to take on two research projects in different fields was propelled by my curiosity to explore my research interests. Upon entering university, I knew there was a wide range of topics to study in astronomy, so I wanted to have some exposure to the fields I found most intriguing, then I would be able to narrow down my interests once I enter a graduate program.

I secured a research role under Dr. Dennis Zaritsky during my second year to study ultra-diffuse galaxies (UDGs). Due to their extreme mass-to-light ratio, UDGs are important probes in galaxy evolution and dark matter halos. For the past two years, I have been developing analysis software in python to systematically measure the frequency of nuclear star clusters (NSCs) in UDG candidates in the Systematically Measuring Ultra-Diffuse Galaxies (SMUDGes) catalog. In order to detect the potential NSCs, I constructed multi-component models of the galaxies using GALFIT. I created masks and point source function (PSF) profiles to increase the precision of our results and made simulated point sources to determine the magnitude limit of detecting a potential NSC in UDG candidates. Once I created a catalog of UDGs with potential NSCs, I analyzed the relation between the magnitude of the point source, the magnitude of the galaxy, the color, and the radial offset between the point source and the center of the galaxy. My first-author paper will be submitted to the Astrophysical Journal for review in Spring 2023, and I will present my findings at the 241st AAS conference iposter session. Further avenues to explore in the subject would be to determine the different properties of these galaxies seen in different wavelengths and to explore the spectra in NIR or X-ray to determine dust or star-forming regions in the galaxies. The galactic population of these types of galaxies at high redshift would also be exciting to research in the future.

In my third year, I joined Dr. Bender and his collaborators at Penn State on TESS exoplanet follow-up characterization. I specifically worked on a binary star system, labeled TOI-5375, with an early M-type host star and a companion initially identified to be a planet candidate. I used the radial velocity (RV) data procured from the Habitable-zone Planet Finder (HPF) and ground-based transit data from the Red Buttes Observatory (RBO) to investigate the orbital and physical parameters of the companion using a package called exoplanet which utilizes a Hamiltonian Monte Carlo Markov Chain to find the best fit. I used a secondary eclipse function and a Keplerian function to model the transit data and RV data respectively. We concluded that the early M dwarf has a companion that is an object near the hydrogen burning mass limit (0.08 M_sun) with an estimated age of 400 Myrs and an orbital period of 1.72 days. The goal was to increase the sample of objects within this mass range and provide data to improve stellar evolution models with physically derived parameters of an eclipsing binary system. My first-author paper is being circulated amongst co-authors and will be submitted to the Astronomical Journal for review by early December. Throughout my undergraduate research, I have gained an appreciation for the art of formulating the right questions, and I see graduate school as a pursuit of my own inquiries.

In my undergraduate years, my curiosity for astronomy developed into a motivation to pursue a career based on research and teaching. With a reputation for superb research and academics, CU Boulder is a place that aligns with my values and has a tight-knit community among students. As I intend to complete a Ph.D. in astronomy in galactic evolution studies, I believe CU Boulder will enhance my skillset through its holistic program dedicated to fostering an environment to set up future astronomers for success through rigorous courses and supportive faculty. With the distinguished galaxy researchers here, I am open to working with many professors at this university including Dr. Jeremy Darling and his work on probing black holes in dwarf galaxies because I find that topic aligned with my interests and previous experience. I would also be interested in working with Dr. Jack Burns and his work on dark matter and galaxy clusters. Living in Boulder would also be a lovely change in climate from the heat of the Tucson desert. For all these reasons, I hope to be a part of the graduate program at CU Boulder.

I intend to receive a Ph.D. in astronomy at Penn State in the field of exoplanets. Upon earning my Ph.D., I plan to continue my career in academia as a postdoctoral researcher working on similar research and pursuing a professor position. Due to the impact previous physics professors have made on my education, teaching university-level physics and astronomy was my initial academic aspiration when I began my undergraduate career. Now, I want to pursue a profession that will allow me the freedom to dive into questions I have about the universe through research while also teaching astronomy classes.

When I was a freshman at the University of Arizona, I was overwhelmed by my imposter syndrome due to entering a male-dominated field without recent experience in physics and astronomy, but thanks to the supportive faculty and peers, I broke out of my shell and became immersed in the community by connecting with professors during office hours and holding multiple leadership positions in the university's Astronomy Club. I have been greatly involved in the club since joining my first semester. I was elected the Vice President last year, and I am the current President leading the club of over 100 active members. Along with increasing the annual funding for the club from $100 to $600, working with the department administrators to organize an out-of-state summer trip to San Diego, and conducting telescope training events for members, I lead the diversity, equity, and inclusion initiatives of the Astronomy Club. I am a queer woman of Japanese descent, and I view myself as a role model for the incoming members to show that there can be someone who is similar to them in a leadership position. While President, the officers and I implemented a code of conduct as well as increased the amount of DEI presentations during our weekly meetings. Furthermore, the majority of the outreach in which the club participates are volunteer telescope observation events at public elementary schools where students normally do not have the opportunity to explore space through a telescope. Listening to their questions and imaginative explanations for astronomical phenomena will always reignite that spark in me to pursue teaching and science communication.

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some exposure to the fields I found most intriguing, then I would be able to narrow down my interests once I enter a graduate program.

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In my third year, I took an observational astronomy course with Dr. Chad Bender where I was introduced to photometric data analysis while measuring the pulsation period of a B-type hot subdwarf using data collected at the 61” telescope at Mt. Bigelow. I identified 10 frequencies, including the dominant p-mode frequency using the Fast Fourier Transform (FFT) method. The following semester, I joined Dr. Bender and his collaborators at Penn State on TESS exoplanet follow-up characterization. I specifically worked on a binary star system, labeled TOI-5375, with an early M-type host star and a companion initially identified to be a planet candidate. I used the radial velocity (RV) data procured from the Habitable-zone Planet Finder (HPF) and ground-based transit data from the Red Buttes Observatory (RBO) to investigate the orbital and physical parameters of the companion using a package called `exoplanet` which utilizes a Hamiltonian Monte Carlo Markov Chain to find the best fit. I used a secondary eclipse function and a Keplerian function to model the transit data and RV data respectively. We concluded that the early M dwarf has a companion that is an object near the hydrogen burning mass limit (0.08 M_sun) with an estimated age of 400 Myrs and an orbital period of 1.72 days. The goal was to increase the sample of objects within this mass range and provide data to improve stellar evolution models with physically derived parameters of an eclipsing binary system. My first-author paper is being circulated amongst co-authors and will be submitted to the Astronomical Journal for review by early December. Throughout my undergraduate research, I have gained an appreciation for the art of formulating the right questions, and I see graduate school as a pursuit of my own inquiries.

Being mixed race, I navigate life with a unique lens of trying to preserve my heritage while presenting white. This includes acquiring a minor in Japanese with the goal to hold conversations with my mother and grandparents. I intend to use my privilege to further educate people on areas to improve accessibility in astronomy and uplift the voices of BIPOC astronomers. Expanding on my outreach initiatives in the future, I plan to continue on this path of lowering the barriers to entry to astronomy using the knowledge I've gained from my outreach experience. AstroFest seems like a good starting point to get involved in outreach at Penn State. I would also enjoy participating in Towards a More Inclusive Astronomy (TaMIA) to work towards a more inclusive environment in astronomy.

In my undergraduate years, my curiosity for astronomy developed into a motivation to pursue a career based on research and teaching. With a reputation for superb research and academics, Penn State is a place that aligns with my values and has a tight-knit community between faculty and students. As I intend to complete a Ph.D. in astronomy in exoplanet studies, I believe Penn State will enhance my skillset through its holistic program dedicated to fostering an environment to set up future astronomers for success through rigorous courses and supportive faculty. With the astounding number of exoplanet researchers here, I am open to working with many professors at this university. I would like to continue my research in exoplanet characterization with Suvrath Mahadevan as I have worked closely with several graduate students and post-doc fellows in his group. I would also be interested in working with Eric Ford in his exoplanet formation research. Having access to telescopes like the HET in Texas and NEID in Arizona will enhance my graduate experience as well. Also, I grew up on the East Coast, so the mid-Atlantic region is familiar to me. For all these reasons, I hope to be a part of the graduate program at Penn State.