**Annual Report June 2019 – December 2020**

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Electrical Engineering and Music

Music Program Director

**NB:** Since my Promotion and Reappointment Dossier covered material up through Spring 2019 , this Annual Report covers the 19 months between June 2019 and December 2020.

**Looking Back: Major Activities and Accomplishments** over the last 19 months

Activity/Accomplishment 1: **June 1, 2020**

**NSF Grant Award, 250K: Partnerships for Innovation – Technology Transfer (PFI-TT)**

Development of a Novel Audio Technology that Applies Dynamic System Variability to Create Musical Variations for Personal and Public Applications

This research and development grant enables my CantoVario project (melding musical variations, chaos science, acoustics, and signal processing) to move from prototype to product. The award provides funding for Olin students, consultants, and equipment.

Symbolic systems transmit information in a variety of applications, such as DNA sequences, synthetic biology, and combinatorial chemistry. They also form the backbone of music, which can be viewed as highly context-dependent sequences of symbols where each note or event foreshadows those yet to come. The awarded technology offers new ways of engaging with music, both for music streaming service listeners and musicians. (Musicians comprise 26% of the US population.) It brings Olin College of Engineering its first PFI-TT award, offers meaningful employment opportunities for Olin students, and signifies external recognition of the CantoVario project.

Pointers to relevant evidence: NSF site for award + abstract <https://www.nsf.gov/awardsearch/showAward?AWD_ID=1941526&HistoricalAwards=false>

Activity/Accomplishment 2A: **December 2019**

**ASEE 2019 Best Paper, Zone 1**

“The Engineers’ Orchestra: a Conductorless Orchestra for Developing 21st Century Professional Skills”

This award brings recognition to Olin College as an institution spurring innovative educational projects, recognizes the multi-talented students comprising OCO, and provides external recognition of the role of a conductorless orchestra for developing professional skills in leadership, teamwork, and effective communication.

Pointer to relevant evidence: <https://strategy.asee.org/the-engineers-orchestra-a-conductorless-orchestra-for-developing-21st-century-professional-skills>

Activity/Accomplishment 2B: **June 24, 2020**

**ASEE 2020 virtual National Conference, Best Zone Papers Session**

Video Presentation: The Engineers’ Orchestra: a Conductorless Orchestra for Developing 21st Century Professional Skills”

The presentation captures the rationale behind OCO, buttressed by performance clips and the results of a 4-year study on the effectiveness of OCO for building skills in leadership, teamwork, and communication.

Pointer to relevant evidence: <https://drive.google.com/drive/u/1/my-drive>

Activity/Accomplishment 3A: **April 7, 2020**

**U.S. Patent awarded by the USPTO (United States Patent and Trademark Office)**

“Method and Apparatus for Computer-Aided Mash-up Variations of Music and other Sequences, Including Mash-up Variation by Chaotic Mapping”

This patent enables complete mashups of popular songs, so that the mashups themselves sound like fully formed songs. The algorithms captured in the patent underpin the mashups found in the current cantovario.com website. These results supported the NSF-funded PFI-TT proposal discussed above in Activity/Accomplishment 1.

Pointer to relevant evidence: <https://uspto.report/patent/grant/10,614,785>

Activity/Accomplishment 3B: **February 27, 2020 - present**

**Continuation in part patent filed with the USPTO**

“Method of Creating Musical Compositions and other Symbolic sequences by Artificial Intelligence”

In writing the PFI-TT proposal, I realized my musical variations research could impact machine learning progress in music. I’m in the process of extending that research now.

 Pointers to relevant evidence: Douglas Burum (Maine Cernota & Rardin)

Activity/Accomplishment 4A: **Spring 2020**

**New half-semester course—Engineering Systems Analysis (ESA:Systems), with Chris Lee and Siddhartan Govindasamy**

ESA:Systems involves building, developing, and practicing process-based quantitative analysis skills in the broad area comprising linear analysis of engineering systems. Concepts such as linearization, equilibrium, and stability will be applied to study the dynamic response of electrical and mechanical systems in both the time and frequency domains through time-integration, transfer functions, and state-space analysis. Ideas from feedback control are introduced. Coursework and projects will involve examples such as robots, communication systems, or aircraft/spacecraft.

Parts I and II of ESA were, and continue to be, a love. Interacting with the students, co-developing with Chris and Siddhartan, and learning much in the process, entwined to make a memorable course. ESA comprises the latest offering in the QEA series, thus contributing to Olin’s curriculum. We presented our course as part of a workshop offered during the Virtual Summer Institute in June 2020.

Pointers to relevant evidence: Chris Lee, Siddhartan Govindasamy, ESA part 1 Canvas site <https://canvas.instructure.com/courses/1822396>

**New half-semester course—ESA:Signals, with Siddhartan Govindasamy**

Linear system theory offers a powerful set of mathematical tools used broadly across science and engineering. Signals represent the transfer of information or power, while systems represent operations on these signals. ESA:Signals extends material from the first half-semester to focus on fundamental concepts such as frequency response, convolution, impulse and step response, sampling and aliasing, transforms (CTFT, DTFT, z), and modulation. These concepts are presented within the framework of linear operators and transforms in discrete- and continuous-time. Applications include filters, system identification, and communications.

Pointers to relevant evidence: Siddhartan Govindasamy, ESA: Signals Canvas site

<https://canvas.instructure.com/courses/1882482>

Activity/Accomplishment 4B: **Fall 2020**

**New online AHS Foundation course:**

**Singular Voices, Dual Lives—Nabokov, Leonardo, Bach, Borodin**

To what extent have artists exhibited extraordinary knowledge and ability in science and engineering? Do these necessarily infuse their art, and if so, how? Artists in the fields of literature, art, and music include Vladimir Nabokov (writer and lepidopterist), Leonardo da Vinci (artist and engineer), Alexander Borodin (composer and chemist), and J. S. Bach (composer, performer, and acoustician). Each achieved a self-sufficiency enabling the articulation and activation of work that reveals an inimitable signature; in short, an entrepreneurial streak runs through their lives, fueled by their individual voices and the remarkable ingenuity resulting from their dual professions. In-class and out-of-class activities focus on student scholarly and creative work, with special attention paid to research with primary and secondary source material. Students will have the opportunity to realize projects in the arts and sciences, thus experiencing firsthand the satisfaction and challenges faced by Bach, Borodin, Nabokov, and Leonardo in their desire for knowledge, discovery, and creative expression.

Pointers to relevant evidence: Canvas site <https://olin.instructure.com/courses/193>

Activity/Accomplishment 5: **October 26, 2020**

**IEEE Spectrum online article about the Olin Conductorless Orchestra (OCO)**

“Conductorless Orchestra Helps EE Students Fine Tune their Professional Skills”

Article by Joanna Goodrich, Asst. Editor at The Institute, describes how OCO develops leadership, teamwork, and effective communication in engineer-musicians.

Pointers to relevant evidence: Joanna Goodrich, <https://spectrum.ieee.org/the-institute/ieee-member-news/conductorless-orchestra-helps-ee-students-fine-tune-their-professional-skills>

Activity/Accomplishment 6A **Fall 2019 – Spring 2020**

**Seven arrangements of works for the Olin Conductorless Orchestra, in addition to 6 additional versions due to changes in instrumentation**

During the 19-20 academic year, I created 7 original arrangements (aka re-orchestrations of symphonic works) for OCO’s eclectic instrumentation, i.e., its unbalanced wind, brass, and string sections. This is relevant because, as OCO students have noted in the past, “we wouldn’t have an orchestra without these.”

Due to changes in instrumentation resulting from student schedule conflicts, I produced another 6 arrangements, for a total of 13.

Pointers to relevant evidence: Fall and Spring Expo recordings, as well as the below (included for future reference – feel free to skim).

Fall 2019 and Spring 2020. Seven original orchestral arrangements of works for 16 players (**flute, alto flute, clarinet, alto sax, trumpet, 2 trombones, euphonium, 0-1 timpani, piano, 4-3 violins, viola, and 2 cellos**)

* Dvorak *Symphony no. 8 in G major, Op. 88 (Allegro con brio).* **Dvorak** wrote his Eighth Symphony for 2 flutes, piccolo, 2 oboes, English horn, 2 clarinets, 2 bassoons, 4 horns, 2 trumpets, 3 trombones, tuba, timpani, and strings (38 violins, 14 violas, 12 celli, 8 double basses).

Two additional re-orchestrations due to a cellist attending a SWE (Society of Women Engineers) conference the same weekend as our performance for the Admissions Fall Open House, followed by a diminished violin section for Fall Expo due to an Immigration meeting, in addition to the original re-orchestration based on the October instrumentation.

* Beethoven *Egmont Overture*. ***Beethoven’s*** *Egmont Overture* calls for 2 flutes, 2 oboes, 2 clarinets, 2 bassoons, 4 horns, 2 trumpets, timpani, and strings (24 violins, 8 violas, 6 celli, 4 basses). Two extra re-orchestrations due to a cellist attending a SWE conference the same weekend as Fall Open House, followed by a diminished violin section for Fall Expo, in addition to the original re-orchestration based on the September instrumentation.
* Holst Intermezzo from the *First Suite for Military Band*. **Holst** wrote the *First Suite for Military Band* for 2 flutes, 2 piccolos, 2 oboes, Eb clarinet, 3 Bb clarinets, Eb alto clarinet, bass clarinet, 2 bassoons, alto sax, tenor sax, baritone sax, bass sax, 2 cornets, 2 trumpets, flugelhorn, 4 horns, 2 trombones, bass trombone, euphonium, 2 double basses, and percussion. Created arrangement for the 9 OCO wind/brass + piano performers.
* Fauré *Pavane*. **Fauré** scored his *Pavane* for chorus and orchestra, including 2 flutes, 2 oboes, 2 clarinets, 2 bassoons, 2 horns, and strings (26 violins, 10 violas, 8 cellos, and 6 basses). Three arrangements: the original September re-orchestration, a re-orchestration using only 1 cello, and a re-orchestration using 3 violins instead of 4.
* John Mackey *Night on Fire.* **Mackey** wrote *Night on Fire* for 4 flutes, piccolo, 2 oboes, 2 bassoons, contrabassoon, 4 Bb clarinets, bass clarinet, contrabass clarinet, soprano sax, alto sax, tenor sax, baritone sax, bass sax, 4 trumpets, 4 horns, 2 trombones, bass trombone, euphonium, tuba, double bass, and percussion. Created arrangement for the 10 OCO wind/brass/timpani/djembe + piano performers.
* Justin Hurwitz/Robert Longfield *La La Land.* **Hurwitz/Longfield** scored *La La Land* for string orchestra. Created arrangement for the 6 OCO string players.
* Fauré *Élégie.* **Fauré** scored the *Élégie* for solo cello, 2 flutes, 2 oboes, 2 clarinets, 2 bassoons, 4 horns, and strings. The *Élégie* was to be performed by senior Kian Raissian as part of his AHS Capstone project. I finished the arrangement on March 12 so that OCO could play it as part of our last rehearsal before the College closed on March 13, due to covid.

Activity/Accomplishment 6B: **October 2019 – March 2020**

**10 Music Program concerts showcasing our students for Olin and external communities**

These concerts are significant because they reach core Olin constituencies: families (Family Weekend), external professional visitors (e.g., at Expo), prospective students (Fall Open House), and students + families attending Candidates Weekends.

Concert preparation (rehearsals and dress rehearsals) for Fall 19 and Spring 20:

• 3 OCO concerts: Family Weekend (Oct. 11), Admissions Fall Open House (Nov. 9), Fall Expo (Dec. 16)

• Wired Ensemble concert for Fall Expo (Dec. 16)

• 3 Candidate Weekends (CW) concerts by OCO (Feb. 21, 28, Mar. 6)

• 3 CW concerts by Wired Ensemble (Feb. 21, 28, Mar. 6)

Pointers to relevant evidence: recordings, communications from Olin parents, students, alumni, sponsors, professional musicians, and Candidate Weekends audiences

Activity/Accomplishment 7: **September 1, 2020**

**Promotion to Professor of Electrical Engineering and Music**

**Reappointment to a 6-year contract**

Pointers to relevant evidence: AY 19-20 Reappointment and Promotion Committee

**Looking Back: Other Activities and Accomplishments**

1. June 16, 2019. Presented “The Engineers Orchestra” as part of the 2019 ASEE Cooperative & Experiential Education Division (CEED) showing the integration of the arts into engineering education.
2. June - August 2019. With student funding provided by the Integrated Project Fund, I worked with Luis Zuniga ’21 to design and implement “The Engineers’ Conductorless Orchestra Hub”, a website containing useful resources, such as videos, blueprints, and orchestral arrangements, to help other engineering schools start their own conductorless orchestras.  This project was Luis’ first foray into web design using HTML, CSS and JavaScript, languages with which he had no prior experience.  He did an incredible job!  The site can be accessed at <https://pages.olin.edu/eco-summer2019> .
3. Fall 19 semester: OCO switched from meeting once/week to twice/week, a decision proposed by, and then voted on, by the students. (During Spring 20, the students proposed and voted to return to weekly rehearsals.)
4. September 11, 2019. Invited to participate in the Ecosystem Panel:  Idea to Impact at MIT as an NSF I-Corps National Teams PI before an audience of MIT Sloan Fellows, Sloan School of Management. I loved every minute of this experience. Meeting and talking with other entrepreneurs helped expand my horizons.
5. Fall 19, Spring 20, and Fall 20. Every year I supervise Independent Studies (IS) and mentor AHS Capstones in Music. I provided feedback to the following students as they progressed through their independent projects: **Flynn Michael-Legg** (Experiential Composition IS: Flynn composed, mixed, and recorded an EP of five original songs); **Alex Bahner** (Hip Hop Production IS: Alex composed, mixed, and recorded an EP of four songs); **Richard Gao** (Mixing Electronic Music IS: Richard successfully completed an 8-week online course requiring 4+ hours of recorded lectures and 4 hours of live classes, including production of 3 original songs); **Kian Raissian** (Bach’s Fifth Cello Suite: Kian recorded the Prelude); and **Jeremy Ryan** (Jeremy wrote an original composition, *Montuno*, for piccolo, flute, clarinet, bass, piano, and percussion).
6. November 16, 2019. Wired Ensemble class field trips to the **Metropolitan Opera** to hear the *Marriage of Figaro.* This field trip was the 17th trip to NYC by the Wired Ensemble, exposing them to the performing arts in one of the great music capitals of the world.
7. December 9, 2019. Wrote and submitted proposal to Chou Family Foundation: “Enabling students in the Olin Conductorless Orchestra to engage in short, yearly tours.” Approximate total cost: $50k. The importance of such a tour to OCO students was summed up by a student comment on Fall 19 course evals: “I really appreciate the work she put into trying to continue to have an OCO spring trip every year because that was definitely one of my highlights of OCO.” Numerous students have mentioned how much they loved the past tours, and the bonding they experienced. Many of our peer institutions have orchestral tours (e.g., Stanford, Harvard-Radcliffe, Princeton, Cornell, Carnegie-Melon)
8. January 8, 2020. BOW (Babson, Olin, Wellesley) Teaching and Learning Workshop on Universal Design for Learning given by Dr. Elizabeth Hartmann. The workshop provided a chance to expand my pedagogical knowledge and learn from colleagues at BOW colleges.
9. June 8-12, 2020. The Virtual Summer Institute. With Chris Lee and Siddhartan Govindasamy, ran a Focus Workshop on Engineering Systems Analysis. Served as a Design Coach for a new engineering program at the University of North Carolina, Chapel Hill (with Scott Hersey), as well as Design Coach for a re-organization of the engineering curriculum at Baylor University (with Joanne Pratt).
10. September – December, 2020. Member, Reappointment and Promotion Committee.
11. **Music Program Director Activities/Responsibilities**

* Preparing music program information sessions for first year students.
* Individual counseling for first year musicians, regarding auditions, music lessons, etc.
* Jam room coordination with students.
* Maintenance of East Hall Steinway A in conjunction with CORE
* Attendance at music events featuring students and alumni, as well as those featuring staff and faculty, including FWOP plays and musicals.
* Other responsibilities include:
  1. Providing orchestration, composition, theory, and performance skills to support all facets of the program
  2. Helping students find ‘good fit’ private teachers for their particular instruments
  3. Producing musical opportunities for students to create and perform
  4. Organizing and rehearsing concerts for Olin events (Family Weekend, Admissions Open House, Fall and Spring Olin Expositions, Candidates Weekends, etc.)
  5. Bringing in external coaches to provide additional feedback to students
  6. Maintaining instruments
  7. Evaluating/coordinating all tunings and repairs of the AC 305 Steinway B, Yamaha AC 318 upright, MH Steinway B, and East Hall Steinway A
  8. Periodically checking Steinway A so it stays in good shape (requested by Olin’s piano tuner/technician)
  9. In tandem with marketing and student input, coordinating action photos of Olin musicians in performance and rehearsal
  10. Working to ensure the music program continues to grow, thrive, improve

1. **Explanatory notes for the OCO re-orchestrations (arrangements of symphonic works).** In creating these re-orchestrations, I strive to make OCO sound as full and varied as possible, with a wide dynamic range, different colorations, strategic doublings, and effective solos/duets. Yet constraints exist, e.g., the comfort ranges of the OCO musicians. Though one could be tempted to just substitute one instrument for another, this isn’t an option for many reasons, some of which conflict with others:

* Instrumental, sectional (strings, winds, brass, percussion), and orchestral voice leading.
* Contrapuntal and harmonic intent of the composer.
* Non-traditional instrumentation, i.e., instruments typically not found in an orchestra such as piano and saxophones.
* Non-standard ratios of strings to winds and brass
* Reduction from 90+ player orchestrations to 12-22 player arrangements (e.g., the 22 wind/brass instruments required for the Berlioz “Marche Hongroise” vs. the 8 that were available in OCO), or an increase in forces, as from a wind ensemble to a mixed string/wind/brass/percussion group.
* Balance issues, e.g., non-standard numbers of wind, brass, and strings comprising their respective sections
* Creating the impression of large forces through dynamics, color contrasts, decreasing/increasing texture, among other strategies. OCO typically likes ‘big’ works.
* At the start of each semester I ask students for their comfortable high and low *forte* notes and high/low *piano* notes. These often dictate what I can and cannot do, resulting in re-orchestrations particular to OCO.
* I try to give each student a good part that speaks to his/her strengths, while also challenging weaker aspects of an individual’s playing (provided the student shows a commitment to mastering an earlier part). I also try to give each at least one challenging part so they can ‘rise to the occasion’, hopefully paving the way for additional challenging parts. When material is repeated, I’ll often vary the orchestration with each repetition (e.g., the Berlioz “Marche Hongroise”) or when duets/trios allow, I switch players in and out, thereby distributing parts (e.g., Mozart’s overture to *Così fan tutte*).
* And lastly, something I always try to do: everyone plays at the end of a piece—at least one note!

**Looking Back: Mapping Activities and Accomplishments**

**Diagram

Description automatically generated**

**Looking Back: Feedback Received**

**Feedback from Colleagues**

**Incorporating a storytelling writing module for Singular Voices, Dual Lives**. Gillian Epstein continues to have progressive ideas for writing in the AHS Foundation courses. Working together, we changed a significant portion of the AHS Foundation Writing component for Wired Ensemble and did the same for the new online 2020 AHS Foundation course: Singular Voices, Dual Lives. Here, students had a chance to write a narrative about how artistic creation fits into their lives as engineering students and what it means to them. We included Close Reading and Evidence workshops, as well as a Storytelling Development and Feedback workshops on student draft narratives.

**External Guests provide feedback to OCO**. Since 2006, I’ve invited 3-4 orchestral musicians in the Boston area to provide external feedback to OCO students each semester. Music benefits from different voices, interpretations, and viewpoints. Students highly value these visits from our external guests. Fall 19 visits included: Rosie Samter, Oct. 15 and Nov. 19; Megumi Stohs-Lewis, Nov. 5; Charles Peltz, Dec. 5. Spring 20 visits: Rosie Samter, Feb. 18. (Due to covid, the remaining visits for Spring 20 had to be cancelled.)

**Piano maintenance feedback**. Whenever Olin’s pianos are tuned by Mark Whitlock, I ask for his assessment on the state of the instruments. On Sunday, Dec. 2020, we met at Olin to review and tune the pianos. After tuning the East Hall Steinway, he alerted me to how hot the practice room had become. I then contacted Claire Rodgers who quickly turned off the heat in that room. She discovered a mechanical failure, then worked with facilities to fix it, keeping me informed till all was stabilized. We’re very fortunate to have her as our Associate Energy Engineer. This is the 3rd time I’ve needed a fix to either heat or AC on a weekend, and each time she addressed the issue quickly. I was also grateful to Tom Curley for installing a humidifier for the piano in the East Hall practice room.

**CantoVario (a project combining musical variations, chaos science, acoustics, and signal processing)**. Feedback provided by the MIT Venture Mentoring Service (VMS) Advisory team to CantoVario has benefited this project from the start and continues to do so. Additional feedback from the instructors of the NSF I-Corps National Teams helped CantoVario develop a business model canvas during a 7-week intensive program, May – June 2019. Dr. Jesus Soriano, Director for the NSF PFI-TT program (Partnerships for Innovation—Technology Transfer), helped push CantoVario forward by enacting a thorough “due diligence” process for CantoVario’s R&D plan which led to the 250K grant award discussed above in Activity/Accomplishment 1. Feedback has also come from student and professional musicians, as well as potential users in the music production space at the Bridge, a Knight-funded incubator for musician-producers in Miami, FL. Regarding a second application of CantoVario’s technology, i.e., a prototype chaos/music exhibit for science museums, I conducted customer discovery interviews with senior management at the Ft. Lauderdale Museum of Science and Discovery, as well at the Frost Museum of Science in Miami (December 2019).

**Team-teaching Engineering Systems Analysis with Chris Lee and Siddhartan Govindasamy.** Just as students express how much they learn from their peers, Chris, Siddhartan, and I formed a bond and learned from each other. We brought different perspectives to the table, and those perspectives informed not only us but our students.

**Feedback from Students**

**The Olin Conductorless Orchestra**: OCO functions as a project-based learning course (PBL) where students experientially practice leadership, teamwork, and communication skills week in and week out. Responses to Fall 19 OLOs show that OCO students believe they’re on target with respect to “Communicate Effectively”: the students ranged from ‘Moderately (=2)’ to ‘Quite a bit (=9)’, producing a course mean of 3.8/4. The same numbers held for the OLO “Collaborate Successfully.” With respect to “Develop and Apply Creativity”, the student responses ranged from ‘Somewhat’ (=3) and ‘Moderately (=2)’ to ‘Quite a bit (=6)’, producing a course mean of 3.3/4. As an orchestra, I’d like us to meet and discuss what creativity means for a conductorless orchestra, including all the ways it applies to OCO.

Responses to Spring 20 OLOs yielded course means from 3.2 to 4.0, except for “prioritize doing good in the world’ (2.7).

Since Olin has started a new era with the appointment of Dr. Gilda Barabino as our second President, the time seems right—given the call for action amidst new beginnings—to say something that has been on my mind for the past 3 years: Admissions needs to actively seek out good engineer-musicians, particularly instrumentalists. During AY 2019-20, OCO students have confided that the orchestra is not as good as in previous years. They’re right. I noticed a drop in the caliber of musicians starting in Fall 17. Then we lost our concertmaster who graduated in 2018, followed by our 3 first violins when they graduated in 2019. That left the Fall 19 orchestra with 2nd violins functioning as first violins. Please keep in mind: you can never have enough good violins!

I’ve discussed the above with Susan Brisson who told me Admissions knows “there has to be music at Olin because otherwise students won’t come.” To try to increase the musician pool, I personally wrote every admitted student musician in April 2020 and answered their questions. Some of these emails required an hour or more to write due to questions/circumstances posed by the Admits.

On March 12, OCO held its last rehearsal. When I think back on that night, I see us as a group expecting the best outcome, not the worst. I wanted everyone to take their instruments with them so they’d still be able to express themselves through music, yet held open the possibility that we’d all be back after spring break. How innocent our thinking. After spring break, OCO went virtual. Students signed on to doing PIPs (personal instrumental projects) where each selected a piece to work on. Each week they submitted mp3’s of their progress for peer and professor feedback. Students appreciated these projects.

In turn, I appreciate their comments; they help calibrate me from semester to semester. For example, both Fall 19 and Spring 20 course evals contained some variant of the comment, “When rehearsing Diana always brings wonderful comments to the group and really does help us sound better every week. Though it’s interesting that more and more I feel that when a decision is put in front of the orchestra, we always end up going with Diana’s suggestions even when other alternatives exist. I think it might have something to do with the fact that the orchestra might be intimidated to go against anything Diana says.” As I’ve said in the past, working with OCO poses a balancing act. Still, I believe my suggestions necessarily increased in AY 19-20 due to the decreasing quality and number of instrumentalists Olin admits. If the orchestra sounds bad, Olin looks bad; musical students and students who love music will go elsewhere. To avoid that outcome, I end up doing everything in my power to ensure as high a standard as possible.

Take a moment and imagine an Olin without these OCO musicians; scores of faces are now passing through my mind— students who made indelible imprints on the College through their smarts and humanity, not just through their music. For the past 3 years, we’ve been dealt an increasingly difficult hand; it’s been a slippery slope. So of course I’ve had to step in more during rehearsals. Also, as an orchestrator I’ve been increasingly asked to do what other professionals consider almost impossible: how did she do that? Well, I like a good challenge, and I think people count on that; but then I wonder: does it have to be this way? My dedication to OCO and its students stays strong; I’ve managed to create a stirring group sound for the students, despite a crazy assortment of instruments. If the students don’t hear a coherent group sound, it’s harder to be inspired by what they’re playing (and rightly so). We have some excellent musicians in OCO, but the number is dwindling. We especially need good string players, particularly violins. In short, OCO and other musical groups on campus need more support. Sadly, for several years now, they too have noticed the lack of musicians among admitted students.

OCO was decimated in Fall 20 by covid, not only by students opting for LOAs or waiting for a return to in-person rehearsals and concerts, but also by covid-produced conflicting signals. For example, though Rae-Anne Butera kindly okayed students practicing their instruments, including wind/brass instruments, in their individual dorm rooms, someone told incoming students not to bring their instruments.

So the Fall 20 OCO comprised just the 2 elected navigators—Caitlin Coffey ’23 and Jack Mao ’22—and myself. At first we researched and experimented with low latency synchronous software to enable rehearsals and performances. We stayed in touch with students and faculty at MIT and NEC, but ultimately abandoned these efforts when they had as little success with the software as we did.

I had resisted doing what many orchestras were doing: recording parts and mixing them together because I knew how much our students valued playing ‘live’ with one another. But then I realized that recording might provide a way to finally address the uneven levels of playing in the orchestra, something we have a chance to remedy in Spring 21. So I worked with Caitlin and Jack to further develop student performance and professional skills, regardless of whether students would be on- or off-campus due to the pandemic.

For Spring 21, students who pass the audition will select pieces for the orchestra, and I’ll continue to create arrangements (re-orchestrations for OCO’s eclectic instrumentation).  But now, students will learn and record their parts to a more exacting standard inherent in the recording process—a process that has a long history with musicians dating back to the advent of audio.  We learn so much by hearing ourselves on playback.  Moreover, we hear what can be improved and that inspires practice in order to reach a higher level of performance. Though OCO has often recorded itself as a whole, its players have rarely had the opportunity to record themselves on their own parts.  Caitlin and Jack tested each step of this process, and during our weekly meetings, we vetted and wrote the guidelines and recording instructions for the prospective Spring 21 OCO students. Covid has unwittingly given us a chance to help each musician increase their musicianship and technical skills through recording. Or as the old saying goes:  when life gives you lemons, make lemonade!

Regarding the Fall 20 course evals: Perhaps because Jack and Caitlin had such agency during Fall 20 (we were designing the new OCO as a team), coupled with their commitment to the orchestra, their OLOs were high across the board. They’re also strong players who want to build (and play in) an excellent orchestra. Thus their OLO evaluations for Think Critically, Develop and Apply Creativity, Develop/Apply Self-directed Learning Abilities, Collaborate Successfully, Design/Implement Processes to Achieve Desired Outcomes, Communicate Effectively were high; each of these OLOs had a mean of 4.0/4. (For completeness: Develop/Apply Knowledge, Skills, Approaches and Methods, Doing Good in the World, and Develop Personal/Professional Identity each had a mean of 3.5/4.)

**The Wired Ensemble**: I missed teaching Wired Ensemble during Fall 20. It was last given in Fall 19. As in the past, it was an engaging experience. For the next iteration (possibly Fall 21), we’ve upgraded to Sibelius Ultimate2020, from Sibelius 2013. The later version enables better capture of improvisation, something that can be helpful for students whose notation skills can’t quite capture what they want. In Fall 19, some students appreciated the push the course gave them while others felt their musical skills weren’t enough of a prerequisite. I believe this may be another indication that our admitted students aren’t as musically developed as those in the past, and maybe this is why I found myself giving less theory than in past years. Still, the range of abilities in Wired has always been large. What I’ve tried to do is help each student reach their musical potential. For those who clearly want this development, I’ll push them. For those that indicate it’s not a priority for them, I try to meet them at their level and go from there. This is why Wired is structured around a lot of individual attention. I’m also able to give more advanced assignments to those who desire more challenge.

The strongest OLOs were Develop and Apply Knowledge, Skills, Approaches and Methods (3.6/4 mean), Develop and Apply Creativity (3.8/4 mean), Develop and Apply Self-Directed Learning Abilities (3.3/4 mean), followed by Communicate Effectively, Develop Personal/Professional Identity, and Design/Implement Processes to Achieve Desired Outcomes, each with 3.1/4 mean. As a first-year course, these OLO benchmarks appear reasonable. But Think Critically was not as high (2.8 mean) with Somewhat (4), Moderately (5), and Quite a bit (2). I’d be curious what happened in other AHS Foundation courses for Fall 19.

**Singular Voices, Dual Lives (AHS Foundation)** I poured my heart into this course, creating materials and assignments to guide student research into primary and secondary sources on Nabokov, Leonardo, Bach, and Borodin. There were 40 varied learning activities during the latter 2 months and I asked students to anonymously mark which of these they found useful for their learning. Nine of the 11 students did the evaluations. After giving so much to the course, I was happy to see that they rated almost all of them as useful. My hope was that this course might make a difference in their lives, that the examples of Nabokov, Leonardo, Bach, and Borodin might help guide their efforts through life’s thicket as they did mine. In fact, on December 8, after our last scheduled class, I received the following email from a student:

Hi Diana, I know that the semester is not over yet, but I was asked during this OFYI class to think about someone who I am grateful for and send them a note. One of my first thoughts of who to write a message to was you. Not only has Singular Voices: Dual Lives been an extraordinary class that I feel has taught me a lot, but even small things like the discussions we have during office hours always make my day (even if it means I end up late for class). While there have been some rough spots, I can say that I have developed a lot during this first semester into someone who is more careful, more hardworking, more curious, and more inspired because of you. Something tells me that this four-year journey is going to be an incredible one, and I cannot wait for you to become a part of it!

The above student and a number of others (more than half) stayed after our 3-hour final activities class to thank me individually for the course and talk briefly. The feedback felt affirming, definitely worth all the work I put into this class. So it was a surprise to receive the course evaluations, much of it counter to what I described above, and some of it contradicting other parts of the course evaluation.

Still, I find myself ready to put some of the feedback into practice towards a future iteration of the course. First of all, I wanted to have more class discussion but at the same time, I wanted to give as deep a perspective on each of these artists as possible. These were in direct conflict. In short, I may have taught Singular Voices more as a graduate course than as an Olin Foundation course. Based on individual sessions where I gave feedback to each student on their work, I felt the vast majority of the class appreciated the depth. Many had little experience with primary and secondary source material, how to research and evaluate sources on the internet, the scholarly process of citing sources (for both powerpoint slides and written work), and how to pronounce names/topics when they weren’t sure how to say these. I gave them tools for all of the above, collectively and individually, as needed.

The students did well with certain OLOs: Develop and Apply Creativity (3.3/4 mean), Develop/Apply Self-Directed Learning Abilities (3.2/4 mean), Communicate Effectively (3.4/4 mean), Develop Personal/Professional Identity (3.2/4 mean). But Think Critically had only one ‘Quite a bit’, 7 Moderately, 2 Somewhat, and 1 Not at all. More class discussion would likely have helped improve this score. I was trying to address it predominantly through their written work which I’d review with each of them individually. In thinking further, I realize it needs to happen through a variety of means!

Course Question 10 (**Made connections with other subjects, courses, and disciplines**) received 4 Strongly Agree, 3 Agree, 3 Disagree and 1 Neutral, comprising a 3.7 Mean. Yet virtually each class centered on our big course question: To what extent did these artists’ knowledge and ability in science/engineering infuse their artistic work, and how? Specifically, we were studying the most advanced technology of the Baroque (pipe organs) and Bach, 19th century chemistry and Borodin, Lepidoptera and Nabokov, and Renaissance engineering, anatomy, art, and the list goes on for Leonardo. Wherever possible, we studied the historical context for these personages and their work. So I’m at a loss to explain the low mean for Course Question 10. Also, I don’t understand how Faculty Question Q22 (**Connected the course content to other subjects of disciplines**) was interpreted by the students. It fared so much better across the board; they *all* Agreed or Strongly Agreed (4.4 mean).

Course Question 11 (Helped me think creatively about the subject) had a Std. Dev. of 1.03, yet the Faculty Question 21 with the same question had a much lower Std. Dev. (.62). I sometimes wish we had a chance to meet with students after receiving an evaluation so we could more clearly understand their reasoning and ask questions, as needed. I realize this is probably impossible due to the need for anonymity. Yet for a person always looking for ways to make something better, it would help!

Regarding assignments: I changed several during the semester due to student input about workload. For example, the course assistant sent me an email at 10:37 on a Friday night in October explaining that one of the students felt our assignment was too heavy, given the workload in QEA and Design Nature. Two hours later, I re-scoped the assignment and sent a revised version to the class in the early morning hours.

Using a related metric on number of hours spent on the course outside of class: 9 students spent 4-7, 1 spent 8, and 1 spent 12-15. So **all students save one were doing 9 hours or less per week, well within Olin’s 9 hours/week for a 3-hours/week class**. Yet students said the workload for Singular Voices was Average (4) or Heavier (5) compared to other Olin courses. (Two students said it was lighter.)

Regarding the Faculty questions: I believe that increasing time devoted to class discussion will improve “Used class time effectively”, even at the expense of covering less material. I made the classic mistake of getting carried away with all I wanted to share with our students, so at times could have taken more time to explain a difficult subject. When I took student feedback on what they wanted to cover with respect to a particular artist, e.g., what questions they wanted to address, I found they wanted to know a lot. In particular, with Leonardo, they wanted to know so much I felt compelled to cover everything. I could teach a whole course on Leonardo and never lack for materials. Ditto for Bach. Likewise for Nabokov.

I realize that a Strongly Disagree, Disagree, or even Neutral can offset a majority of Agrees and Strongly Agrees. For 8 of the 10 Faculty Questions (Q21 – Q28), one or two evaluations were consistently lower than the other 10 or 9 Agrees and Strongly Agrees. Yet despite the 1-2 outliers, Q22 – Q28 had means ranging from 4.1 to 4.4 so the 82-91% of the class held sway. I really loved this class and its students, even the ones who may have given some poor ratings. From my years as a performing pianist in New York and elsewhere, I learned from everyone, realizing that almost all feedback has some truth in it. Thus, I’ll continue to learn and revise.

In thinking through future iterations of Singular Voices, I will take more of the audience in mind. The course I gave to the first years, as it stands, is perhaps more suited to juniors, seniors, and grad students. If I were to give it again to first years, I would only include 3 of the artists (Nabokov, Leonardo, Bach), thus enabling more time for varied class discussion, as well as assignments that lead directly to those discussions. Full disclosure: I thought I was doing that, but clearly it didn’t happen.

With respect to my 8 Course-Specific Questions regarding Learning Objectives: The same 82-91% of students nailed these, excepting one or two who again gave lower evaluative responses for 7 of these course-specific learning objectives.

Regarding the Novice, Competent, Proficient, and Expert student responses to Olin’s listing of Course-Specific Questions: the 3 objectives listed for my course were incorrect, an error I recently corrected with Olin’s Assessment team.

Finally, here’s an interesting fact that I can’t quite explain, especially in light of the above discussion: Attendance for all 28 classes was perfect!

**Engineering Systems Analysis (ESA:Systems) with Chris Lee and Siddhartan Govindasamy**

ESA:Systems ran for the first time during Spring 20 as the half-course prelude to either ESA:Signals or ESA:Dynamics. It concluded on March 13, after which Olin closed its campus due to covid. Our students noted that ESA:Systems lacked a clear structure at the beginning but quickly got into gear. Chris, Siddhartan, and I put a lot of work into its delivery. We were a well-functioning team. Personally, it was a joy to teach with them.

ESA:Systems focuses on quantitative analysis in the service of engineering design. So certain OLOs were targeted more than others. Using a scale of 1 to 4, students cited Develop/Apply Knowledge/Skills/Approaches/Methods (3.7 mean), Think Critically (3.8 mean), Develop/Apply Creativity (3.1 mean), Develop/Apply Self-Directed Learning Abilities (3.5 mean), Collaborate Successfully (3.0 mean), and Design/Implement Processes to Achieve Desired Outcomes (3.4 mean) as dominant learning objectives, indicating the course proved quite effective for using analytical tools to smartly scaffold project work. There was an end-of-term project where students formed 2-3 person teams to build a stable inverted pendulum on a moving cart using control system tools such as the Laplace transform, stability criteria, block diagrams, feedback (Black’s formula and PI control), in conjunction with MATLAB tools.

Since the course covered both mechanical and electrical engineering circuits and concepts, students responded to Course Question 10 (Made connections with other subjects, courses, disciplines) with a mean of 4.2/5. Course Question 12 (Included assignments that contributed effectively to my learning) rated the highest mean (4.5), whereas Q13 (Distributed the workload appropriately throughout the semester) received the lowest (3.5). A course mean of 4.0/5 resulted from Q11 (Helped me think creatively about the subject). As Chris and I now prepare an online version of the course for Spring 21, we’ll see if we can distribute the workload more evenly. Student comments were thoughtful and influential for our next iteration, e.g., “I was excited to do the rocky project in this course, and the content leading up to that was everything I hoped it would be. I know that other students found some of the content very challenging, but I would only recommend smoothing out some rough edges in the assignments instead of removing the difficult problems. I can see that they are there for a reason, and I found them encouraging me to take successful leaps of faith with what I had learned in the course.” Other comments focused on the layout of the tables and seating arrangements not being optimal for group board work. This will be more challenging in an online environment.

With respect to my part in the course, standard deviations were highest with Explained Material clearly (.93) and Connected the course content to other subjects or disciplines (.96). When I explained electrical engineering material, I was comfortable and therefore likely clear, but the mechanical engineering material was more challenging for me so I was not always comfortable and therefore not as focused. In those cases, I didn’t want to take up student time unnecessarily so referred them to Chris. This may have also affected the evaluation score for “Gave useful feedback on my work” (3.8 mean). Clearly, I want to improve on the mechanical engineering parts of the course. My other metrics ran from means of 4.0 to 4.5, with a 4.1 mean for “Overall, was an effective teacher” (10 Strongly Agree, 15 Agree, and 6 Neutral).

**ESA: Signals** **with Siddhartan Govindasamy.** I loved teaching this course. Siddhartan and I were a great team, and the students liked how we interacted with one another and with them. Siddhartan presented continuous-time signals and systems, and I covered discrete-time signals and systems. We came together for the final project.

The OLOs scoring 3.0 and higher were exactly the quantitative analysis we hoped to develop: Develop/Apply Knowledge/Skills/Approaches/Methods (3.8 mean), Think Critically (3.9 mean), Develop/Apply Creativity (3.0 mean), Develop/Apply Self-Directed Learning Abilities (3.4 mean), Design/Implement Processes to Achieve Desired Outcomes (3.3 mean), and Communicate Effectively (3.0 mean).

The course also did well with making connections with other subjects/courses/disciplines (4.1 mean), helping students to think creatively about the subject (4.1 mean), providing assignments that contributed effectively to their learning (4.6 mean), and distributing the workload appropriately throughout the semester (4.8 mean).

Student comments on the course itself were great, with some useful suggestions, e.g., a request for a few creative mini-projects and signals experimentation with more open-ended prompts, more time allowed for the final project, and “concept mapping” done by students, rather than the professors.

Because Signals ran via Zoom, we were able to record our classes; students appreciated being able to go back into a presentation to review any concepts. We also posted our slides ahead of time to help students follow along with their own copies. Definitely practices I’ll want to carry over into the Spring ’21 iteration.

Since I’ll be teaching ESA:Signals and ESA:Systems in Spring 21, I’m finding the process of carefully reviewing student course evals timely, e.g., we’ll want to make sure it’s clear where we’re headed with a concept and why, before explaining the details of getting there. I believe I’ve done this in the past (having taught S&S many times, I have the big picture), but now think it’s necessary to reiterate the goal more than once, i.e., remind students why the goal is significant and why it matters.

In evaluating ESA:Signals, students hit our course-specific learning objectives (Q46 – Q52) with means ranging from 4.1 to 4. 4.

Finally, I was pleased to read the student comments and see the results of the faculty questions pertaining to my contributions to ESA:Signals, e.g., Faculty Question 24 (Used class time effectively) evaluated at 4.5 mean (SA 9, A 5, D 1. My other faculty metrics ranged from means of 4.1 to 4.7, with a 4.4 mean given for Overall, was an effective teacher (SA 8, A 5, N 2), where SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree. I learn a lot from student comments, where they faltered, what they like, and accompanying suggestions. And sometimes, it’s a comment that gives a shot in the arm, e.g., from one student who wrote in Comments for this faculty member: “Love the connections to other disciplines and clear explanations during lectures! Really delivered fascinating information and loved to see how excited she was about it. It made me super excited about it too! Lectures were a bit fast at times, but all in all didn’t deter my learning.”

**Reflection on the previous 19 months**

NB: This reflection covers June 2019 – Dec. 2020 because my R&P dossier covered through May 2019. Since the above Feedback section details much of my course work results, thought, and analysis, the below reflection captures other aspects of my professional work, e.g., my intellectual vitality, NSF grants, R&P, a Best Paper process, and further consideration regarding OCO, given the start of a new era under President Gilda Barabino and Provost/DOF Mark Somerville.

June 18, 2019 found me in 3 cities on the same day: Tampa, New York, and Boston. First I had to fly to Tampa to give a short talk on the Olin Conductorless Orchestra as part of a panel for the 2019 ASEE National Conference. But since saying “yes” to the panel, my musical variations project (CantoVario) had received a 50K NSF Innovation Corps (I-Corps) National Teams grant for customer discovery. From May 6 to June 14 I had completed and analyzed 170 in-person interviews with professional and aspiring musician-producers in Miami, Nashville, and the greater Boston area. Since I had to fly to Nashville the next day (June 19) and deliver a presentation as part of my I-Corps commitment, it was tempting to cancel ASEE, but I had made a commitment to the Session Chair and went ahead with what turned out to be a crazy day.

In the morning, I boarded a plane for Tampa. During the flight, I prepared my talk for the session. But when I got to the Tampa Convention Center, I found out ASEE had no registration in my name for the conference. It looked like they would charge the full conference fee ($700), but then I explained that I flew in to honor this one commitment, and was flying out right after it – so they just let me through.

But 10 minutes before I was to give my talk, JetBlue sent me an email saying my flight to Newark was not taking off till 845pm, arriving 1123pm in Newark, and my connecting flight back to Boston would leave just 14 minutes later. I’d had experience with delays on JetBlue and they always last longer than initially projected. The prospect of not getting home in time to take a flight to Nashville on June 19 prompted a call to JetBlue asking for a route change through JFK and then JFK to Boston. But getting through to JetBlue took forever, and my session had now started. Finally, a kind JetBlue agent scheduled me for a 6pm flight to JFK with a connecting flight 1120pm arriving 1240am in Boston. I was so grateful and walked into the session. Five minutes later, it was my turn to speak. Afterwards, I Lyfted back to the airport, hopped on the 6pm flight, and arrived JFK 930pm only to find that my scheduled flight to Boston wouldn’t leave till 1215am. Walking to the gate, I was lost in thought and mistakenly ended up at another gate where a plane just happened to be boarding for Boston. I asked the gate agent if she could please get me on this flight. Cut to the chase: after making sure everyone else was on board, she got me a seat. Her name is Regina and I had to hug her.

I was off again the next day, this time back to Nashville for the final presentation on “Lessons Learned” from the 7-week NSF I-Corps intensive ‘boot camp’ on customer discovery. Upon arriving, I started working with Jacob Kingery ’16 on the presentation. Just days before, we had to make a video that described our I-Corps journey – 2 minutes of ups, downs, mistakes, successes, all highlighted with particularly insightful interviews and some very funny moments.

June 20 was taken up with I-Corps group activities among the 22 teams, and finally that night at 6pm we were able to put together the presentation. I then had to practice it; we eliminated stuff and fine-tuned things so it would fit within the strict time limit of 10 minutes. Got to bed at 330am. Had to wake up 6am to be in the presentation room at 8am. While I got dressed and ate breakfast, I kept practicing the presentation in my head, visualizing the slides as I talked. It was extemporaneous.

I’m happy to say the presentation went great. I was hoping that “performance mode” would take over, and it did. The talk just flowed. I was totally in the moment. It was a beautiful feeling.

No sooner did I finish the NSF I-Corps National Teams conference than I was urged by one of my MIT mentors to apply for a follow-on NSF grant for CantoVario: Partnerships for Innovation – Technology Transfer. It was due just 2 weeks later. There were a number of deliverables, including the 15-page project description. Each day felt like a roller coaster. Is it going to make the deadline, not make it? Literally, every hour brought positive news or a response of ‘uh-oh, now what?’ A lot of people were going to be involved, and I found myself spending time with each. At the same time, the clock was ticking relentlessly. The only time I really had to think and write the 15-page description was late at night.

Also, CantoVario (my musical variations project) needed Letters of Support from knowledgeable people, including professionals I didn’t even know. For example, part of the project involved a chaos/music prototype exhibit for a science museum. So I reached out to the Museum of Science in Boston but they took a week to finally say no. Only a day before the grant was due did a letter arise from a connection to the Museum of Science and Industry in Chicago, which I later found out is the largest science center in the western hemisphere. I wrote to a friend’s contact there at 730 on a Monday night, and was amazed to hear just 30 minutes later that they were interested. That was a real roller coaster day, but the ride intensified the night before the grant was due. I still had much to do on the 15-page description. I remember looking at the clock at 3am and bolstering myself to read and digest 13 patent abstracts and claims sections in order to satisfy an IP management section. After finally lining up everyone on the team, I was now racing against the clock. Not knowing what I would say to all these people who had signed on, and to those who had written letters of support, simply put a fire under me. I never went to sleep, just kept working in studio 305 at Olin. An incredible friend stepped in to help me out with the ‘references’ section, and somehow everything came together. Then at the last minute, the NSF submission site kept complaining about margins, despite fixes. At that point, 4:55pm, Susan Mihailidis called NSF to clock in the problem. NSF said they’d look into it. The next day I couldn’t even look at a computer, let alone work. But when I checked my email on Friday of that week, I found a message from the program director and the NSF IT admin telling me what to do and to do it by 5pm that day. Ho boy, did I race back to Olin to work with Travis Songer on this. He traced down the problem with the margins. Travis was a wonderful help that day. It was my first time working with him, and we’ve continued working together ever since.

So I next turned my attention to making my dossier for promotion and reappointment. That was not to be believed. I really had no idea how much I’d done until I had to start preparing the text + evidence for the past 19 years. I had put promotion off for so long due to time and other constraints. But an MIT EECS mentor lit a fire under me, as did several of my colleagues and friends. Preparing my dossier turned out to be a HUGE job. I stayed up all night on Sept. 2 so I could get it in on Sept. 3. Classes had already started. But in early October, the Reappointment and Promotion Committee told me I had to organize it better, or delay applying for another year. They were right about the organization, but I also knew that a delay would lose my inner momentum. Enter our wonderful colleague Rob Martello. We discussed the revision, meeting 4 times over the next month. Those discussions really helped me to better understand the process. They were creative and fun too! I finished the revision on Nov. 15.

The following week I heard from the program director of the NSF PFI-TT program, notifying me that my proposal was going to undergo a “thorough due diligence” process, with emphasis on the “thorough” part. Not knowing when that was going to take place, I went ahead and booked a quick trip to Miami to meet with music producers there and also with museum executives and exhibit directors. During Fall 19, I’d worked on pushing CantoVario further along so wanted to test it with the producers. I also realized I needed to understand more of what museums wanted and expected from exhibits. This trip (Dec. 25 – Dec. 31) provided considerable insight that ultimately informed critical parts of my responses to the “thorough due diligence” process alluded to above.

I spent the first 10 days of 2020 trying to catch up on everything I had postponed for the last 8 months, but that was relatively short-lived because on Jan. 11, the NSF program director sent me 29 Action Items that I had to respond to. He had really done his homework because the action items were precise and thorough. He gave me until Jan. 25 to respond to them. Trouble was I got the worst ever “cold from hell” and was slated to start teaching a new course (ESA discussed above) on Jan. 24. It was a perfect storm. So I stayed up till dawn at Olin on Jan. 25 and completed the remaining Action Items. It felt WONDERFUL driving home that morning. I got an hour of sleep and then drove to get a haircut. It was a perfect day. The exhilaration of finishing, learning so much in the process, and writing responses as succinctly as possible, without sacrificing important details, simply floated my boat.

I went about the first half of the Spring 20 semester with my courses, including the Olin Conductorless Orchestra, and the new Engineering Systems Analysis course. I loved both of them. But on Mar. 11, I happened to bump into Dave Barrett in the AC. He asked me what I was doing for spring break, and I said, “going to New York.” And he started telling me that his contacts at the Defense Department were preparing for a pandemic. I had no idea what was coming. He said, “buy toilet paper, Diana. Just go buy toilet paper.” So late that night I drove from Olin to Star Market in Porter Square and picked up 2 giant packages of toilet paper that had just come in.

The next weeks were hectic for all of us. Trying to order what we needed, preparing to teach online, learning zoom, how to do breakout rooms, etc., and connecting with students, colleagues, family, and friends– and the list goes on. Yet I was still burning the candle at both ends, wondering when I’d have some time for myself. There had been no chance to do my hobby (electric trains) during the past year. Yet at the same time, I realized how fortunate we all were: we loved our work and had jobs. Teaching and interacting with peers and students during the last half of the semester gave a much-needed respite from the news of the day.

On May 12, I had a memorable conversation with Mark Somerville. He told me I’d been promoted to professor with a 6-year contract based primarily on “what the external reviewers said about you, Diana, and what students said.” That was wonderful to hear, yet what made the conversation truly memorable was the ease and depth with which we discussed all that had transpired inside and outside Olin.

On May 20, the PFI-TT Grant Award from NSF came through for 250K. After working on my musical variations project for numerous years, and “holding it together with string and glue”, in the words of the former CFO of Kurzweil—it’s finally funded. I’ve worked so hard, believing in it through thick and thin, yet am beyond glad to have NSF confirmation of its potential.

Summer 2020 brought another pressing deadline. In April 2019, I took the Olin Conductorless Orchestra to perform for the Zone 1 ASEE (American Society for Engineering Education) International Conference in Niagara Falls, NY. I also had to write a paper (“The Engineers’ Orchestra: a conductorless orchestra for developing 21st century professional skills”). Two days before Christmas 2019, I received an email out of the blue saying congratulations, your paper has been selected as the Best Paper of 2019 for Zone 1. I didn’t quite believe it until congratulatory emails started arriving. So in June 2020, I was required to prepare a powerpoint video on the paper for presentation at the virtual 2020 ASEE Annual Conference where all 4 zone best papers comprised a ‘Best Zone Papers’ session. Though my paper didn’t win the overall best zone paper prize, all of us are now invited to present as part of the Distinguished Lecture Session at the 2021 ASEE Annual Conference in Long Beach, CA.

At this point I wanted to say a little more about the composition of the 2019 orchestra, the orchestra that performed for the 2019 ASEE Zone 1 International Conference in Niagara Falls, NY, in April. The composition of this orchestra posed enormous challenges with respect to orchestral balance. Our instrumentation changed from fall to spring semester due to juniors studying abroad so I had to re-orchestrate pieces from first semester, as well as new pieces for 2nd semester. The Spring 19 instrumentation was eclectic, to say the least. Instead of having a standard wind section (2 flutes, 2 oboes, 2 clarinets, 2 bassoons), we had 3 flutes and 1 alto sax. For the brass, we had 1 trumpet, 1 euphonium, and a trombone—that provided a fairly balanced brass section. But 6 violins with only 1 cello – and no violas – what a challenge. Thus we had extremely unbalanced wind and string sections. Still, the students chose pieces scored for 90+ instruments: they love those big romantic pieces! I managed to make them sound full and big, i.e., have a good group sound. But it took time. The concerts went well, especially the concert for the ASEE concert in Niagara Falls. In fact, it went from beginning to end: a ‘to-die for’ performance. But the student in charge of videotaping the concert forgot to bring a large enough SD card, so we have no recording. This was hard to take at the time, still is. Though OCO played the same program on May 10, the performance wasn’t as good. It was a big lesson for me. Pay attention to the recording mechanism. I adore the student who messed up; realized I had too much on my mind to worry about the recording. Big mistake.

Yet despite the above challenges, I would die for an orchestra with that composition again. Why? Because since 2016, Olin has enrolled fewer and fewer good musicians. I don’t know why. Our orchestra keeps shrinking with each year’s fall auditions. Yet OCO’s musicians have been among the strongest students at Olin (as noticed by other faculty). Despite the shrinkage, and lack of first violins, we’ve managed to put on decent Fall 19 Admissions Open House and 2020 CWs concerts. But unlike earlier orchestras, there is no recording of a piece requiring violins that was good from start to finish. Though we have some excellent players in OCO, the number is dwindling.

Another point: In addition to good first violinists, and string players in general, we need timpani. In Fall 19, we had no timpani, and you can hear the results in the fall recordings. I knew we had to have timpani for the 2020 CW performances so I met with OCO’s former timpanist, Joseph Lee ’19, in January 2020. He had just married months before, was setting up a household, and had a high-power job with FormLabs. But if any of you know Joseph, you know not only his brilliance (he was writing patents at 14) but also his kindness. During Spring 20, he generously came to rehearsals after work so we had timpani for CWs 2020. Timpani make a huge difference for the energy of an orchestra. If an orchestra doesn’t hear an energizing group sound, players will often over-compensate, resulting in a harsh tone.

In sum, OCO needs help from Admissions so we can in turn provide our best for their (and Olin’s) mission. It’s really a two-way street. Given the start of President Barabino’s tenure at Olin and the ensuing fresh thinking/approaches, can we work together to once again admit good musicians to Olin? Musicians already understand discipline, practice time management, and understand how to create something bigger than themselves. They inherently possess the building blocks for meaningful lives and successful careers. Think of what the Olin community would have been like without our past musical students. Recall their faces, their contributions to Olin—hundreds of them from 2002 – 2016. Together we built music into a stirring component of Olin’s fabric, responsive to constituencies comprising Admissions, Family and Alumni Relations, Student Life, and External Engagement. But music requires excellence. It cannot be faked. I believe that’s part of its allure; as good as a concert is, you can always hear a better performance. The challenges continuously pull something better from our musical selves. The muse inspires, motivates a desire to express our deepest feelings for love, meaning, and purpose in life. And amazingly these feelings are not limited to the performing musicians but extend outward to the listening community. This underscores what Susan Brisson articulated over a year ago: if we don’t have music, the students won’t come.

**Looking Ahead: Goals and possible activities for the coming year**

**What are your personal goals for the coming year, and longer term?**

1. Work with Chris Lee to make ESA:Systems an effective online experience
2. Produce an ESA:Signals course that builds on last spring’s successes
3. Find funding for more performing opportunities for OCO outside of Olin so we can announce these to prospective students
4. Move forward with CantoVario’s R&D plan
5. Compose another concert of “Variations and Shadows”, i.e., a “variation concert” piece
6. Expand the song base of CantoVario Mashup

**What do you see as important Olin goals that you can contribute to over the next year, and beyond?**

Contributions to Olin’s leadership in the educational space:

1. ESA workshops in conjunction with the Collaboratory and Summer Institute
2. ESA presentations at ASEE
3. Exporting the conductorless orchestra model to other engineering schools

**Given these goals, identify activities that you *might* pursue in the coming year.**

* Motivating appreciation for and admittance of good musicians
* Continued work in the pedagogical Signals & Systems/DSP space
* Work with students talented in music and engineering to help them realize their goals
* Contribute to a vibrant Olin community culture that fosters growth, openness, creativity, and ‘doing good’.

**What does Olin need from you?**

1. Creativity and resourcefulness for internal and external projects that help develop students, build the college, and achieve impact
2. Continued work and involvement with electrical engineering courses
3. Continued work and involvement with music composition and performance courses, as well as AHS Capstones and Independent Studies in Music
4. Continued work and involvement with AHS Foundation courses
5. Continued work and involvement with developing the Music Program at Olin

**What do you need from Olin?**

* Help with attracting and admitting musicians to build up OCO and other musical performing groups on campus, e.g., the Olin Jazz Orchestra, the Olin Rock Orchestra, PowerChords
* Summer support for an Olin student would be helpful.

Thank you!