“I feel privileged to have had this wonderful opportunity. This fellowship has given me far greater insights into medical education. I am truly grateful for the time spent in these sessions with my peers...which contributed to my increased perception of the role of medical education in my career.”

— 2018–2019 MEDICAL EDUCATION FELLOWSHIP PARTICIPANT
# Table of Contents

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>LETTER FROM THE DIRECTOR</td>
</tr>
<tr>
<td>3</td>
<td>LETTER FROM THE DEPUTY DEAN FOR EDUCATION</td>
</tr>
<tr>
<td>4</td>
<td>EDUCATOR DEVELOPMENT</td>
</tr>
<tr>
<td></td>
<td>Conferences</td>
</tr>
<tr>
<td></td>
<td>Series</td>
</tr>
<tr>
<td></td>
<td>Workshops</td>
</tr>
<tr>
<td></td>
<td>Certificate and Degree Programs</td>
</tr>
<tr>
<td>12</td>
<td>ASSESSMENT</td>
</tr>
<tr>
<td></td>
<td>Student</td>
</tr>
<tr>
<td></td>
<td>Curriculum</td>
</tr>
<tr>
<td></td>
<td>Educator</td>
</tr>
<tr>
<td>18</td>
<td>TECHNOLOGY</td>
</tr>
<tr>
<td>20</td>
<td>STANDARDIZED PATIENT PROGRAM</td>
</tr>
<tr>
<td>21</td>
<td>CONSULTATIONS AND COLLABORATIONS</td>
</tr>
<tr>
<td>23</td>
<td>TEACHING AND LEARNING CENTER ORGANIZATIONAL CHART</td>
</tr>
<tr>
<td>24</td>
<td>TEACHING AND LEARNING CENTER TEAM</td>
</tr>
</tbody>
</table>

### Report Committee

- Richard Belitsky  
  Deputy Dean for Education  
- Janet Hafler  
  Associate Dean for Educational Scholarship; TLC Director  
- Dorothy DeBernardo  
  TLC Associate Director for Operations  
- Abigail Roth  
  Director of Communications, Medical Education

### Contributors

- Nita Ahuja  
- Emma Brennan-Wydra  
- Dana Dunne  
- John Encandela  
- France Galerneau  
- Michael Green  
- Barbara Hildebrand  
- Stephen Huot  
- Vijii Kurup  
- Gary Leydon  
- Rachel Liu  
- Andrés Martin  
- Jill Max  
- Jeremy Moeller  
- Tara Sanft  
- Linda Sarro  
- Michael Schwartz  
- Amanda Taheri  
- Peter Takizawa  
- Thilan Wijesekera

### Photography

- Allaire Bartel  
- Emma Brennan-Wydra  
- Anthony DeCarlo  
- Mara Lavitt  
- Robert Lisak  
- Harold Shapiro

### Report Design

- Yale Printing & Publishing Services
The Yale School of Medicine (YSM) Teaching and Learning Center (TLC) has become an integral part of the school since it was established in 2012 to promote and support excellence in medical education.

Recognizing our teaching faculty as the critical foundation of medical education at YSM, the TLC has four primary areas of focus: educator and curriculum development, assessment, and learning technology. We also serve as a medical campus hub for medical education research and scholarship. As we advance each of these areas, we have fostered an expanding community of medical educators across the school, and a body of scholarship that has had impact at YSM, regionally, nationally, and internationally.

This report provides an overview from 2012 through 2019 of the many ways the TLC enhances teaching and learning, including a brief description of our programs and services for YSM and beyond. It also introduces the TLC faculty and staff, and how they intersect with the broader YSM community. Please visit our website (https://medicine.yale.edu/tlc/) to learn more about what the TLC offers.

With the creation of new opportunities, you will see that the breadth and depth of our work is expanding. I look forward to the TLC continuing to strengthen medical education at YSM. This will further the school’s mission to educate and inspire scholars and future leaders in medicine and the biomedical sciences.

Janet Hafler, EdD
Professor of Pediatrics; Associate Dean for Educational Scholarship;
Director, Teaching and Learning Center
The Teaching and Learning Center (TLC) was established in 2012, based on the recommendations of the Yale School of Medicine (YSM) Strategic Planning Committee for Medical Education. These recommendations, contained in a 2010 report, included that YSM should “create a Teaching and Learning Center that has dedicated resources, education experts, and a clear mission to promote excellence in medical education.” The TLC was considered essential for the success of the new curriculum, and important in building and supporting our community of medical educators.

The TLC has become the academic home for medical education at our school. As described in this report, the TLC provides critical support for the curriculum and makes available a range of programs, services, and mentorship for our faculty, residents, fellows, and students who are interested and involved in teaching, curriculum development, and education scholarship.

I am so grateful to all of the faculty and staff at the TLC for helping us realize the vision of our 2010 strategic plan, and for creating such a robust and impactful center. Through their efforts, we are able to demonstrate how much we value, respect, and appreciate our medical educators throughout the medical school.

Richard Belitsky, MD
*Harold W. Jockers Associate Professor of Medical Education and Associate Professor of Psychiatry; Deputy Dean for Education*
Educator Development

The TLC’s educator development programs advance the Center’s mission to foster excellence in education at Yale School of Medicine (YSM) and cultivate a vibrant community of YSM educators.

Conferences

Medical Education Day at Yale: Enhancing Educator Development and Scholarship

Annually since 2013, the TLC has hosted Medical Education Day at Yale (Med Ed Day), a half-day conference that now attracts over 200 faculty, fellows, residents, students, and staff from across Yale’s health professional schools.

Med Ed Day showcases and celebrates the innovation and excellence of medical education and its scholarship at Yale. The program includes a keynote address, small group workshops, and a poster exhibition and competition.

Each year, a nationally or internationally recognized expert in medical education is invited to present the keynote address. The following are samples of keynote titles: “The Urgency of Teaching about Race and Racism;” “Current Approaches to the Evaluation of Trainees in the Clinical Workplace;” and “How the Learning Environment Shapes the Educational Experience for Learners and Teachers.”

Yale faculty members design and lead the small group workshops.

Examples of workshop topics include:

- Documenting Educational Scholarship
- Giving Effective and Interactive Lectures
- Delivery of Difficult News
- Wellness in Medical Education
- Unconscious Bias
- Giving Effective Feedback

Sarita Soares, MD (foreground), Bryan Brown, MD, and Catherine Gao-Howard, MD, lead a 2019 Med Ed Day at Yale workshop.
“Medical Education Day at Yale is an important opportunity to recognize and celebrate the education scholarship and research at Yale. This annual capstone event highlights the creative work of a cadre of educators who serve in undergraduate and graduate medical education. The community that Med Ed Day brings together in celebration each year is a remarkable reminder of the talent of our students, residents, fellows, and faculty.”

— STEPHEN HUOT, MD, PHD, PROFESSOR OF MEDICINE (NEPHROLOGY); ASSOCIATE DEAN FOR GRADUATE MEDICAL EDUCATION

More than 60 posters have been displayed during the Poster Session at Med Ed Day at Yale each year.

The Accreditation Council for Graduate Medical Education (ACGME) identified 15 institutions, internationally and nationally, to serve as regional hubs offering assessment courses for medical school faculty within that region. In 2018, the ACGME invited YSM to be the United States Eastern Regional Hub institution.

In February 2019, the TLC, in collaboration with Yale New Haven Hospital, ran the first conference for over 30 YSM faculty, providing training in student and program assessment.
In 2013, the Macy Foundation selected YSM as one of ten schools to receive a grant for enhancing humanistic teaching in medicine. One of the initial goals of this grant was to enhance physicians’ interpersonal and communication skills to care for patients with compassion and understanding. The Macy Foundation funding enabled YSM to institutionalize the program, which is overseen by Janet Hafler, EdD. Tara Sanft, MD, associate professor of medicine (medical oncology) leads the teaching. The program now involves interprofessional health care providers who engage in facilitated discussion sessions, which include the opportunity to practice skills and explore strategies for humanistic teaching.

“The Humanism in Teaching course has changed my life. This program allows space for discussing important topics health care workers face every day and fosters communication and network formation. We begin to understand each other outside of our ‘titles,’ creating long lasting relationships because of the care we have for each other as humans.”

— TARA SANFT, MD, ASSOCIATE PROFESSOR OF MEDICINE (MEDICAL ONCOLOGY)
Workshops

The TLC designs and delivers a significant number of tailored educator development workshops. Many focus on specific faculty development needs that are identified by department or course leadership.

Examples of topics include:
- Writing Effective Multiple Choice Test Questions
- Using Technology to Build Collaborative Learning Spaces
- Teaching at the Bedside
- Observing Teaching and Giving Feedback
- Facilitating Team-based Learning

CLINICAL REASONING

TLC faculty associate, Peter Takizawa, PhD, assistant professor of cell biology, provides educator development workshops on effectively using TBL as a pedagogy. When YSM launched a new curriculum in 2015 designed to include TBL, which was a format new to many faculty members, this training became critical. Takizawa also provides consultations on TBL and is a resource for faculty members on how to most effectively use the school’s new large group teaching room in the Cushing Whitney Medical Library (CWML).

TEAM-BASED LEARNING (TBL)

TLC faculty associate, Thilan Wijesekera, MD, MHS, assistant professor of medicine (general internal medicine), has developed and led faculty development workshops in clinical reasoning, and created opportunities for direct observation with feedback. These workshops enhance resident, fellow, and faculty members’ teaching of clinical reasoning. Based on Wijesekera’s initial needs assessment, his work to date primarily has involved the Pediatrics, Neurology, and Internal Medicine Departments.

ENHANCING OBSERVATION SKILLS AT THE YALE CENTER FOR BRITISH ART (YCBA)

Linda Friedlaender, BA, MS, leads a group of educators in the Enhancing Observation Skills Session at the YCBA.

The TLC collaborates with Linda Friedlaender, BA, MS, YCBA senior curator of education, to provide training to faculty and residents to develop their observation skills, by observing art. The aim is to enhance their role as educators and clinicians. Between 2016 and 2019, 283 clinical educators from 15 departments participated in the training sessions.
Janet Hafler, EdD, launched Medical Education Fellowship (MEF) in 2010, before the establishment of the TLC. The MEF Program’s goals are to develop faculty members who provide educational leadership and create a strong network of medical educators across YSM. Department chairs nominate YSM faculty members for the program and each year 14 faculty members are selected to participate in the MEF.

Over the course of 18 sessions throughout the academic year, MEF participants study educational literature, explore and practice teaching principles, learn how to assess students and programs, and design educational projects that are implemented at YSM. Each fellow creates a poster presentation of their project that is exhibited on Medical Education Day at Yale, disseminating their work to the broader Yale medical education community.

“Congratulations to the TLC on their extraordinary accomplishments. It has been incredible watching the MEF graduates every year. I am so very grateful to have this resource for our department.”

— NITA AHUJA, MD, MBA, WILLIAM H. CARMALT PROFESSOR OF SURGERY; CHAIR, DEPARTMENT OF SURGERY
TLC faculty associates, Dana Dunne, MD, MHS, associate professor of medicine (infectious diseases), and Viji Kurup, MD, professor of anesthesiology, lead the Clinical Teaching Certificate Program.

This program includes up to seven sessions focused on:
- Learning Climate
- Control of Session
- Communication of Goals
- Promotion of Understanding and Retention
- Evaluation
- Feedback
- Promotion of Self-Directed Learning

“...This seminar has helped me reassess my teaching and create a conducive atmosphere for learning...should be part of onboarding for all educational faculty.”

— CLINICAL TEACHING CERTIFICATE PROGRAM ATTENDEE, OCTOBER 2019

Clinical Teaching Certificate Program
2015–2019

183 Faculty
140 Residents
10 Departments Represented
TLC faculty associate, Rachel Liu, MD, assistant professor of emergency medicine, leads the Point of Care Ultrasound (POCUS) Certificate Program. POCUS is being used more in medical education, and therefore the school needs additional faculty trained in using POCUS to teach medical students and residents. Therefore, in 2019, this program for YSM faculty members was created.

Since 2017, the TLC has offered Medical Education Research Certificate (MERC) workshops to Yale faculty, residents, students, and staff on the YSM campus. The Association of American Medical Colleges (AAMC) provides the teaching materials, and certified teachers, including TLC Director Janet Hafler, EdD, to lead them. Yale has offered sessions that focus on medical education research skills such as searching the literature, scholarly writing, survey design, validity and reliability, and qualitative research methods.

After an educator attends six different MERC workshops, the AAMC awards them a MERC certificate.

The program runs for seven weeks, with participants meeting once a week for a hands-on session and ultrasound image review.

Since 2017, the TLC has offered Medical Education Research Certificate (MERC) workshops to Yale faculty, residents, students, and staff on the YSM campus. The Association of American Medical Colleges (AAMC) provides the teaching materials, and certified teachers, including TLC Director Janet Hafler, EdD, to lead them. Yale has offered sessions that focus on medical education research skills such as searching the literature, scholarly writing, survey design, validity and reliability, and qualitative research methods.

After an educator attends six different MERC workshops, the AAMC awards them a MERC certificate.
In 2017, YSM launched the Master of Health Science - Medical Education Pathway Degree Program (MHS-Med Ed Program).

The TLC designed and leads this two-year curriculum. It is intended for YSM faculty, fellows, and residents with MD degrees who are interested in developing a career in medical education. The program’s core curriculum is built upon an individualized learning plan within the framework of required and elective courses. All participants must complete a medical education research project and write a master’s thesis.

In May 2019, the MHS-Medical Education Pathway graduates were recognized with their departmental leadership and the TLC faculty.
ASSESSMENT

Student Assessment and The Yale System of Medical Education

The philosophy of the Yale System of Medical Education (the Yale System), which has been in place at YSM since 1931, values medical students as mature, highly motivated, and self-directed learners. The Yale System aims to create a highly collaborative learning environment. There is a reduced emphasis on grades and no class rank in order to limit competition. There is a flexible curriculum to accommodate individual learning styles and allow students to pursue individual interests, with self-assessment and collaborative learning emphasized. The Yale System is considered one of the school’s most powerful educational strengths.

The centrality of the Yale System to YSM is clear in the school’s June 2010 Report of the Strategic Planning Committee for Medical Education, which stated, “[a]ll decisions moving forward, including those related to curriculum reform and assessment, must be guided by the fundamental principles and values of the Yale System that give our school its distinct identity and character and make Yale unique among medical schools.”

In the years since this report was issued, the Yale System has greatly influenced the assessment process. There is a strong focus on formative assessments, so that assessments are primarily used to enhance the learning process, not to rank students.

Importantly, as the 2010 report also noted, “[t]he school has a responsibility to society to ensure that its students demonstrate proficiency in competencies related to health care delivery” and to prepare students for life as a doctor “in which continued assessment, feedback, and reflection are woven into the fabric of one’s professional life.” Therefore, within the framework of the Yale System, there is a recognition that summative assessments are also needed.
Student Assessment

Student assessment focuses on the individual learner, to provide students with meaningful information both to help them learn (formative assessment) and to certify that they have met the standards for advancement (summative assessment). Importantly, students use the assessment information to calibrate their self-assessment, reflect on their development, and articulate personal learning plans.

The TLC’s Associate Director for Student Assessment, Michael Green, MD, ScM, collaborates with stakeholders across YSM, including course and clerkship directors, to improve the effectiveness of student assessment throughout the medical school curriculum. A few major examples of this work follow:

- Course examinations: Green collaborates with course leaders to create and analyze qualifying exams for their assessment of and for student learning. This process includes item analysis and improving poorly performing questions.

- Clinical skills: The Clinical Skills Assessment Committee develops, pilots, implements, reviews, and revises assessments related to course objectives, graduation requirements, and the Liaison Committee on Medical Education (LCME) standards.

  The Clinical Skills Assessment Committee developed two Objective Structured Clinical Examinations (OSCEs), which students take before and after the clerkship period. Students may review videos of their performance as they complete a guided self-assessment and reflection exercise.

- Clerkships: A new summative evaluation form was developed, which uses narratives to represent different levels of student competency. The form incorporates the AAMC National Entrustable Professional Activities language, and provides a developmental approach to assess for student learning.

National Entrustable Professional Activities (EPAs)

In 2014, the AAMC published a new set of guidelines that included 13 essential EPAs, which graduating medical students should be able to perform before they enter residency. Examples included performing a physical examination or providing an oral presentation of a clinical encounter. The AAMC selected YSM as one of 10 medical schools to participate in a pilot study that will end in 2020. The goal of the pilot was to test the feasibility of implementing the EPA framework for assessing student competency and facilitating the transition from medical school to residency. Green has conducted several pilots integrating the EPA assessment framework into the YSM clerkship curriculum.
Curriculum Assessment

When the new YSM curriculum was designed, an important aspect was integrating sound, innovative assessment strategies to ensure that teaching promoted learning. This included a close study of the curriculum itself.

John Encandela, PhD, associate director for curriculum and educator assessment, first examined the quality and usefulness of existing mechanisms for evaluating a curriculum. Next, he assessed stakeholder needs and perceptions about what types of data would be most useful regarding the new curriculum. He then designed and implemented an integrated, comprehensive plan for evaluation of the new curriculum, which continues today.

In the first few years of the curriculum implementation, a number of pilot projects were conducted to determine the effectiveness of new methods and processes for delivering content, as well as the usefulness of curriculum content for achieving desired learning. Pilot results were presented to the YSM Educational Policy and Curriculum Committee to decide on needed revisions and steps for further adaptation of the curriculum.

The longest-running series of pilots evolved into what is now called the Interprofessional Longitudinal Clinical Experience (ILCE), which brings together first-year students from three Yale training programs: Advanced Practice Registered Nursing (APRN), Physician Associate (PA), and Doctor of Medicine (MD). After three successful pilots of increasingly larger size, which ran from spring 2014 through 2016, the ILCE became core to the curriculum for all first-year students from the three programs — approximately 250 students per year.

“The TLC has had an important impact on program assessment for the curriculum and learning environment. It has facilitated a uniform standard for assessment of the curriculum and the faculty members who teach in our curriculum. As a result of Dr. Encandela’s academic understanding of assessment, we are now able to engage in more comprehensive and rigorous reviews of curricular content and organization. This also allows our faculty and curricular leaders to view these data as more meaningful and reliable and to be willing to be responsive to areas requiring improvement.”

— MICHAEL SCHWARTZ, PHD, ASSOCIATE DEAN FOR CURRICULUM
As the curriculum has evolved, ongoing assessment occurs through various means, including: continued collection of student, faculty, and curriculum leader feedback; discussions and written evaluations; tracking and reporting of student learning outcomes; and review of these evaluation data by course, clerkship, elective, and sub-internship review committees consisting of representative students, faculty, and staff.

The illustration to the right describes the evaluation process by depicting the pathway of curriculum development, implementation, and evaluation. Periodic review of courses, clerkships, electives, and sub-internships, using evaluation data, begins in Step 4 of this cycle when review committees examine the evaluation data. Then, the review committees discuss these data, interact with the curriculum directors to gain their perspectives, and deliver recommendations that should assist with implementation of the revised curriculum.

**STUDENT ADVISORY GROUPS**

Student Advisory Groups provide an important feedback mechanism that permits students to comment on the curriculum. After each Master Course and after select Integrated Clerkship blocks, students gather to give feedback about the most recent iteration of the respective course or clerkship.

Each year, about one-third of the first-year students receive training in giving feedback to education leaders, and then these students provide leadership for their peers in providing effective feedback to enhance the curriculum.

**LEARNING ENVIRONMENT AND LEARNING OUTCOMES**

YSM leadership asked the TLC to design an evaluation of the new medical school curriculum, implemented in 2015, that would assess its adherence to the values reflected in the Yale System. To track any unintended or unwanted changes to YSM’s supportive, non-competitive learning environment, the Yale Medical School Learning Environment Survey (MSLES) was first administered as a pilot in 2013-2014. Then it was administered annually in the spring semester for the subsequent four academic years.

The survey consisted of 31 items drawn from several validated medical school learning environment surveys. There were a total of 542 responses over the four years of administration. In addition to the MSLES data, student outcomes (e.g., qualifier and clerkship grades; OSCE ratings; and Board scores) have been tracked to determine how the students were performing in comparison to students prior to the implementation of the new curriculum. All curricular evaluation data were presented to the YSM Educational Policy and Curriculum Committee.
Educator Assessment

Effective educator assessment is essential to improve the learning experience for students and to strengthen faculty members’ professional development. In addition, it enables clearly-presented and accurate education and teaching data about a faculty member’s educational contributions to be part of the reappointment and promotion process.

Since the launching of the new curriculum, the TLC has been involved in assisting the medical school to incrementally move from faculty- and department-specific teaching assessments, to more unified, school-wide methods of assessment, while still permitting educators and departments to include data collection tailored to their unique needs. To this end, the TLC has assisted in designing a small set of uniform assessment questions in the master courses, as well as in the integrated clerkships.

Compilation of teaching summary letters, described below, has been another step towards standardization of assessing educational contributions. In 2019, a working group was formed to develop recommendations for a more unified educator assessment approach for any setting.

TEACHING SUMMARY LETTERS
The TLC writes teaching summary letters to provide a standardized summary of faculty members’ teaching activities including: educational leadership; curriculum development and scholarship; mentoring activities; evaluation of teaching by students; and other educational contributions. They are submitted to department chairs and promotion committees to include in the appointments and promotions materials for faculty members who are being reviewed at the associate with tenure level and above.

In 2014, YSM Professor Ismene Petrakis, MD, completed a fellowship in The Hedwig van Ameringen Executive Leadership in Academic Medicine® (ELAM®) Program at Drexel University College of Medicine, through the support of the TLC. The poster to the right presents Petrakis’ work as an ELAM® fellow. The YSM Teaching Summary Letter Program grew out of this early piloted work.
Faculty Teaching Awards

Since 2016, the TLC has been responsible for administering the following teaching awards:

<table>
<thead>
<tr>
<th>Award Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Charles W. Bohmfalk Prizes</strong></td>
<td>Awarded annually to individuals who have made outstanding contributions to the teaching program, as judged by the faculty and students. One prize goes to someone teaching in the basic sciences, the other to someone teaching in the clinical sciences.</td>
</tr>
<tr>
<td><strong>Alvan R. Feinstein Award</strong></td>
<td>Awarded annually to the outstanding teacher of the year of clinical skills, selected by a committee of chairs of the clinical departments, associate chairs, and students.</td>
</tr>
<tr>
<td><strong>The Leonard Tow Humanism in Medicine Awards Presented by the Arnold P. Gold Foundation</strong></td>
<td>Awarded annually to honor the faculty member and the student who demonstrate the highest standard of compassion and sensitivity in interactions with patients.</td>
</tr>
</tbody>
</table>

As YSM Dean, Robert Alpern, MD, presents awards at the YSM Commencement to, from left to right: Michael DiGiovanna, MD, PhD (2019 Alvan R. Feinstein Award); Christine Ngaruiya, MD, MSc, DTMH (2019 Leonard Tow Humanism in Medicine Award); and Akiko Iwasaki, PhD (2018 Charles W. Bohmfalk Prize for teaching in the basic sciences.)
The 2010 YSM Report of the Strategic Planning Committee for Medical Education recommended that one of the three focus points of a new teaching and learning center be technology, “to ensure that the school is informed and up to date about opportunities to use new and evolving technologies in curriculum development, Web-based learning, simulation, and assessment.”

The report noted the importance of consulting with faculty and education committees to assist with developing and implementing educational technology into the curriculum. Reflecting these recommendations, Gary Leydon, the TLC’s associate director for technology services, works closely with the MD Program’s curriculum leadership to ensure the effective and efficient use of technology in all aspects of the MD Program curriculum delivery. Specifically he: manages all cloud-based servers and software required by the electronic systems used in the curriculum; oversees the iPad Program for incoming students and the iPad Mini Program for students entering their clerkships; and develops and maintains custom web applications used throughout the curriculum, in collaboration with YSM educators.

Yale University President Peter Salovey, left, and Gary Leydon at the Linda Lorimer Service Award ceremony in 2016. Leydon was a recipient of this prestigious award that recognizes individuals and teams among Yale staff who have distinguished themselves through a commitment to excellence and innovative thinking.

IBOOKS

YSM’s program in which each student is issued an iPad has been enhanced in the past few years with a growing library of faculty-developed iBooks. These are highly interactive, multimedia, content delivery platforms, allowing for self-assessment and student engagement. To date, Leydon has partnered with faculty to create 25 iBooks spanning Anatomy, Neurobiology, and Clinical Skills. Apple Inc. sends technical representatives twice a year to coordinate with Leydon in providing training and best practices for faculty interested in creating an iBook.

Above is a page from the iBook “Neurobiology Lab Manual.” The black and white illustration on the right is an interactive widget that allows students to engage in a drag-and-drop learning exercise to put a set of MRI slices of a brain into the proper ‘depth’ order.
“Leydon found homemade solutions for problems with existing technology.”
— Jeremy Moeller, MD, MSc

INSTRUCTIONAL VIDEOS

In 2013, Leydon and Associate Dean for Curriculum, Michael Schwartz, PhD, designed and outfitted a video production studio in the CWML for creating short (8-15 minute) instructional videos that offer focused information into a specific topic. These are used to support a flipped classroom instructional design. Since video production began in 2013, YSM educators have created over 280 videos spanning multiple areas of both the pre-clerkship and clerkship periods. The videos are available to YSM students and teaching faculty. Any Yale educator interested in instructional videos may contact Leydon.

For example, when Associate Professor Jeremy Moeller, MD, MSc, and Yale medical student Moises Dominguez had an idea to create video-based lectures and interactive quizzes for the neurology clerkship, Leydon was instrumental in enabling Moeller to avoid having to build expensive new programs. Their eight video-based lectures with linked multiple-choice questions have been part of the YSM medical student curriculum since 2017.

Moeller also has made videos for audiences external to YSM. His 14 video-based lectures have been viewed over 200,000 times on YouTube. Not only does technology make the content widely assessible, but the ability to analyze the metadata of what people click on as they view the videos enables Moeller to gain insights into the learning process.

AUGMENTED REALITY

Another initiative that has grown out of the iPad Program is the piloting of Augmented Reality (AR) technology in the medical school curriculum. A challenge in medical education is how best to explain the three-dimensional (3-D) structures and relationships of human anatomy. The AR app that Leydon developed with a Yale medical student allows the viewer to interact with a 3-D artist’s rendering of the human brain that can be rotated as it appears to hover in the space in front of the user. Various components of the brain can have their opacity adjusted or be hidden altogether to reveal interior structures.

The app is integrated with iBooks allowing, for example, a chapter on the optic system to include a link that will open the AR app and enable students to view the brain structure in 3-D.
When the YSM Standardized Patient (SP) Program was created in 1993, its purpose was to help train pre-clerkship medical school students, by using professional actors who followed patient scripts and behaved in a predictable manner. The SP Program, which was part of the YSM Office of Education, employed eight trained SPs and delivered 12–15 sessions each year. When the TLC opened its doors in 2012, the SP Program was placed under the Center’s direction and it has grown significantly in scale and scope.

In the photo on the left, a student trains for clinical encounters with a standardized patient (background), with faculty member Jaideep Talwalkar, MD (in blue shirt) and other students observing. In the photo on the right, a student (left) practices patient interviewing with a standardized patient (right).

SP Program Manager Barbara Hildebrand and SP Program Director Andrés Martin, MD, MPH, Riva Ariella Ritvo Professor in the Child Study Center, professor of psychiatry, collaborate to oversee the SP Program. They emphasize the program’s importance in supporting learners to practice clinical encounters and refine critical clinical skills in a safe environment where training and debriefing are readily available. Every student in YSM’s MD, PA, and Physician Assistant Online Programs participates in multiple experiential teaching sessions with SPs on topics including patient-centered medical interviewing, female reproductive history, and communicating challenging clinical information. In order to offer students opportunities to train with SPs who accurately reflect the patients with whom they will be working, the TLC makes it a priority to recruit SPs who represent a wide range of ages, ethnicities, and other aspects of diversity.

Standardized Patient Program 2018–2019

- **35 Standardized Patients Employed**
- **124 Educational Activities Conducted**
CONSULTATIONS AND COLLABORATIONS

The Medical Education Student Interest Group is led by students and their faculty advisor, Janet Hafler, EdD. Pictured to the right is an annual kickoff dinner with speaker, Michael Peluso, MD, MPhil, MHS, who graduated from YSM in 2013. The TLC collaborates with the Medical Education Student Interest Group by offering an elective, programs, and by mentoring students’ medical education research and scholarship projects.

“**The master course directors meet with Dr. Michael Green and receive feedback and debrief each exam question, including how it performed, and we receive his practical suggestions for improvement. As Across the Lifespan Director, I have consistently improved our qualifier and quizzes, using Dr. Green’s feedback, and have increased my knowledge of how to write effective multiple-choice questions, thanks to all of the resources and support from Dr. Green and the TLC.**”

— France Galerneau, MD, Associate Professor of Obstetrics, Gynecology and Reproductive Sciences; Director of Across the Lifespan Master Course

The TLC collaborates with the section of General Internal Medicine by co-hosting some Medical Education Discussion Group (MEDG) sessions throughout the academic year. Shown in the photo to the left (from left to right) are: Ninani Kombo, MD; David Ross, MD, PhD; Janet Hafler, EdD; and Patrick O’Connor, MD, MPH. Kombo and Ross presented at an MEDG session on “When Less is More: Enhancing Learning with Mini Lectures.”
Aba Black, MD, MHS, and John Encandela, PhD, collaborate on a curriculum assessment project.

Gary Leydon is available to work with educators to incorporate technology into their teaching to enhance student learning.

Michael Green, MD, ScM, and Katherine Gielissen, MD, MHS, work together on a report for the EPA pilot project.

From left to right: Dana Dunne, MD, MHS, Janet Hafler, EdD, and Thilan Wijesekera, MD, MHS, plan educator development sessions for clinical teaching faculty and residents.

Medical Education Space Renovations

The TLC had an integral role in the recently-completed renovations in the CWML and the Edward S. Harkness Memorial Hall basement. This included sharing insights about the design of the space and use of technology to promote learning.

Medical students practice clinical skills in a newly-renovated Clinical Practice Suite in the Edward S. Harkness Memorial Hall basement. Right: Some of the leaders of the Medical Education space design team in the new large, flexible classroom on the first floor of the CWML.

Left: Medical students practice clinical skills in a newly-renovated Clinical Practice Suite in the Edward S. Harkness Memorial Hall basement. Right: Some of the leaders of the Medical Education space design team in the new large, flexible classroom on the first floor of the CWML.
Dorothy DeBernardo  
Associate Director for Operations  
dorothy.debernardo@yale.edu

Dana Dunne, MD, MHS  
Faculty Associate for Clinical Teaching Educator Development; Associate Professor of Medicine (Infectious Diseases)  
dana.dunne@yale.edu

John Encandela, PhD  
Associate Director for Curriculum and Educator Assessment; Associate Professor of Psychiatry  
john.encandela@yale.edu

Michael Green, MD, ScM  
Associate Director for Student Assessment; Professor of Medicine (General Medicine)  
michael.green@yale.edu

Janet Hafler, EdD  
Director; Professor of Pediatrics; Associate Dean for Educational Scholarship  
janet.hafler@yale.edu

Barbara Hildebrand  
Program Manager  
barbara.hildebrand@yale.edu

Viji Kurup, MD  
Faculty Associate for Clinical Teaching Educator Development; Professor of Anesthesiology  
viji.kurup@yale.edu

Gary Leydon  
Associate Director for Technology Services  
gary.leydon@yale.edu

Rachel Liu, MD  
Faculty Associate for Point of Care Ultrasound Educator Development; Assistant Professor of Emergency Medicine  
rachel.liu@yale.edu

Andrés Martin, MD, MPH  
Director, Standardized Patient Program; Riva Ariella Ritvo Professor in the Child Study Center; Professor of Psychiatry  
andres.martin@yale.edu

Linda Sarro  
Manager for Educator Development  
linda.sarro@yale.edu

Peter Takizawa, PhD  
Faculty Associate for Team-Based Learning (TBL) Educator Development; Assistant Professor of Cell Biology  
peter.takizawa@yale.edu

Thilan Wijesekera, MD, MHS  
Faculty Associate for Clinical Reasoning Educator Development; Assistant Professor of Medicine (General Internal Medicine)  
thilan.wijesekera@yale.edu

The TLC faculty and staff devote a significant amount of time to one-on-one and small group consulting to support faculty, fellows, residents, and students. These medical education consultations address issues such as developing curricula, identifying and tailoring the most appropriate assessment methods, and using technology to enhance teaching. Members of the YSM community also consult with TLC team members about medical education research and scholarship. The TLC consultation request, a brief survey designed to collect pertinent information about a potential consultation, is available on the TLC website.

Dorothy DeBernardo (left), TLC’s associate director for operations, coordinates TLC programs and projects. She receives all TLC consultation requests and is the first point of contact for educators to access the Center’s services.

Visit the TLC website by scanning the QR code (above), or by using the following web address: medicine.yale.edu/tlc/.
Teaching and Learning Center
Yale School of Medicine