A Medical Lesson in Observation and Diagnosis through Art

By Audrey Lee

The intersection between science and art is often overlooked, rather than appreciated. While medical tools and art supplies are not entirely comparable, before MRIs, X-rays, and blood tests, there were brushes, paints, and canvases. During that time, the limited technology and basic understanding of medicine may have hindered precise diagnoses, but the illnesses and diseases themselves still existed. The physical symptoms of such disorders have been documented throughout history, perhaps unknowingly, using careful observation and detailed brushstrokes. Artists were capable of accurately depicting the rashes, pallor, and facies of diseases that were unknown at the time.

Recently, modern day physicians have been exploring the intersection between art and science. By “diagnosing the canvas,” they apply their medical training to famous works of art, and theorize possible diagnoses using evidence from the painting right in front of them.

An array of diseases and illnesses have been observed in a number of medical specialties. In paintings dating as far back as the 16th century, physicians have put forth possible diagnoses for figures depicted in artwork. In Rembrandt’s self portrait, which is on display at the National Gallery of Art located in Washington, D.C., he carefully depicts himself with elderly skin. To the eager museumgoer, Rembrandt simply seems to suffer from the inevitable effects of aging. However, to the medically trained eye, Rembrandt’s skin may point towards an array of dermatology-associated disorders. Others have hypothesized that the textured skin, obesity and an assortment of other

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Letter from the Editor

I have become keenly aware while raising two children that humans do not come with manuals. The answers to undesirable behaviors, confusing illnesses, or night terrors are flummoxing. And just as children do not enter the world with a “Here’s What to Do with Me book” tightly grasped in their little fingers, neither do adults carry a “Here’s What’s Wrong with Me” pocket guide when entering a doctor’s office with a strange rash, cough, and headache.

In their work, doctors and researchers encounter seemingly unrelated clues that may or may not be pertinent. A patient describes a series of problems, and through listening and observation, the doctor creates a list of tests for potential maladies. Now, several medical schools around the country are turning to an unlikely source for diagnostic inspiration, pieces of artwork.

For our previous art-themed issues, we have attempted to find art in science, but this month, we find science in art. Postbac fellow Audrey Lee illustrates (pun intended) the concept of using great works of art to practice tricky medical diagnoses, and Nichole Swan expertly transforms Scott Morgan’s “Speaking about Science” workshop into a beautiful infographic.

Please also check out this month’s Rep Report and October announcements for several enriching opportunities around campus, and learn about the “art” of applying for academic jobs in Dr. Joo Yun Jun’s recap of August’s lunchtime workshop.

For an added treat, several of the background images in this issue are submissions to this year’s Scientific Retreat Image Competition. You’ll find the captivating, award-winning image on page 11!

Your Editor in Chief,
Shana R. Spindler, PhD

Please send questions and comments to our editor at Shana.Spindler@gmail.com.
physical symptoms may in fact indicate an underlying endocrine disorder.\(^2\)

The abstract and illusory nature of art offers a whimsical twist on our outlook. Sometimes, these seemingly abnormal depictions of dancers, flowers, or everyday sceneries can also illuminate an artist’s view of the world. In some cases, visual or neural pathologies of great artists can be traced back from the canvases that hang in famous museums.

Let’s revisit the same Rembrandt self portrait, and now consider the artist’s own perception of himself. Both eyes function to allow stereovision, or the ability to perceive three-dimensional depth on a daily basis. In his self portraits, Rembrandt often portrays himself with misaligned eyes. One eye looks directly at the viewer, while the other eye often gazes to the side. Whether it’s the right or left eye that points directly at you or looks off to the side depends on which of the many dozen Rembrandt self portraits you are looking at. Two neuroscientists at Harvard Medical School made the initial observation. Upon measuring components of Rembrandt’s stare in several dozen self portraits, they concluded that the artist likely lacked normal stereovision. In other words, if this diagnosis was true, Rembrandt struggled to visualize depth in his everyday life.\(^3\)

Many other examples of medical diagnoses made from artwork have been documented. The works of talented artists from centuries ago provide potential insight into the pathologies of both the subjects and the artists. These works also offer a unique educational opportunity. Not only have specialized physicians been identifying medical conditions in famous works of art, but some medical school programs have incorporated “diagnosing the canvas” into their curriculums. A little over a decade and a half ago, the Yale School of Medicine pioneered a medical education program dedicated to teaching first year students the importance of detailed observation. Today, approximately 70 medical
and nursing schools in the country use art to enhance diagnostic and descriptive skills. After several minutes of observing the painting, students reconvene to recap their observations and put forth their diagnoses in a group discussion.

Identifying illnesses and diseases in historic works of art through a modern medical lens can prove challenging. The concluding diagnoses remain speculative, which can parallel the uncertainty that students will face during their medical careers. The exact pathologies depicted in artwork will remain a mystery, allowing students to tap into their creativity and consider multiple narratives. Being able to consider different medical possibilities, each rooted in observation, will hopefully enhance patient diagnoses and outcomes. The foundational bridge between science and art has been established, but now it is time for us to walk across it.

REFERENCES:
As scientists, most of us can relate to the awkwardness you may feel when an uncle at a family dinner asks what you do for a living, and you struggle to explain your work in a way that he can understand. To be a successful scientist, we should know how to communicate our work in an interesting and understandable way to any audience.

The “Speaking about Science” workshop, organized by the NICHD Office of Education and led by public speaking coach Scott Morgan, helps us learn how to explain our science in a relatable way. How we talk about science differs depending on the audience. We use different language when we speak during a lab meeting compared to when we explain concepts to grade school students or when we present a job talk.

You can give a successful presentation to any audience by following a few simple rules when organizing your talk. We break it down for you in this helpful infographic, based on Mr. Morgan's workshop!

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#2: FOCUS
Interesting question. Can’t wait to see the results!

Your “focus” slide(s) establish the specific goal of your study and pinpoint the question you will address.

Focus on a single question.

But what if my talk addresses more than one question?

1. Ask the first question
2. Answer the first question with a money slide
3. Ask the next question, and so on

#3: MONEY SLIDE
That was a great approach. Fascinating data!

This is the section where you give answers to the question you posed. Include relevant methodology and data, which should be clear and well-organized.

Two cents for your money slide:
» Place figures on the left and bullet points on the right
» Consider a slide with no text, only data, allowing for the audience to focus on what you are saying (instead of reading your slide while you are talking)

#4: TAKE-HOME MESSAGE
Excellent direction to take this investigation!

This section summarizes your talk and should be in simple language.

Think of the take home message as the beginning of your exit strategy. Then transition into future directions, future challenges in the field, and even some proactive questions.

GENERAL TIPS
» Organize the talk with the duration in mind (20, 30, 60 minutes?)
» Plan an average of 2 minutes per slide
» Avoid preparing excess slides and skipping them due to a lack of time

A final rule of thumb: it’s always good to end the talk early!
Applying for Academic Jobs: Lunchtime Workshop Recap
By Joo Yun Jun, PhD

Lunchtime career workshop attendees met at building 35 on Aug 31, 2017, to talk about “Applying for Academic Jobs & the Interviewing Process.” Dr. Sarah Cohen from the Lippincott-Schwartz lab, who recently accepted an offer from North Carolina, Chapel Hill as an Associate Professor, and Dr. Tim Petros, who is a recently hired tenure-track faculty in the NICHD as of this March, shared personal experiences about their recent academic job searches and interview processes. Current NICHD fellows enjoyed a one-hour informal discussion, with the opportunity to ask questions of their own. Please read below for several of the questions and a brief summary of Dr. Cohen’s and Dr. Petros’s answers.

Does the K99/R00* award help you find academic jobs?
Yes, it definitely helps. When you have a K99/R00, you have more options of where to go since you are arriving with your own funding. However, if you are hired as an NIH intramural investigator, you do not use the R00 portion of the grant, as explained by Dr. Petros.

Where do you find job postings?
They mostly used the https://www.sciencejobs.org website.

How does the interview process go?
It’s usually two full days with a formal research presentation, chalk talk, one-on-one meetings, and sometimes a Skype interview at the very beginning.

What is a chalk talk?
You have a whiteboard with a marker, and you talk about your proposed work as an investigator as you draw (sometimes they allow you to have some initial drawing as a background). It could last 30 minutes to hours. You have to practice in front of someone to prepare this kind of talk.

What is the time frame of the process?
To apply, job postings are usually available from September through December. Interview offers are sent out between December and March, but sometimes you can get interviews much sooner. You can expect to receive official offers between May and July, with positions starting in September and October.

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Applying for Academic Jobs

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How do you prepare for an interview?
Study whom you will meet with and their research so you can actively discuss their work with them. For one-on-one interviews, you can always ask to meet with a particular faculty member(s) if they don't provide you with your meeting list in advance.

How do you choose from several offers?
You will get a sense of the environment of each department and the institution as a whole, and who your colleagues will be, so you know what you like or do not like. Also, talking with recent faculty hires to the department is highly recommended.

What do you do after you return home from the interview?
Send out “thank you” emails to the people you met!

These were the major questions and answers, but there were contrary opinions on when to actually start applying for jobs. Dr. Cohen started a year before she thought she was ready, to gain exposure to the process and to practice interviewing, although she did not get any offers. On the other hand, Dr. Petros suggested waiting until your research plan is fully shaped and you think you are ready to move, so you can have a strong application since the process takes a considerable amount of time and effort.

*Editor’s Note: The K99/R00 award is the Pathway to Independence Award for postdoctoral researchers. This NIH career development grant program allows young scientists to complete their mentored postdoctoral training and transition to independent, tenure-track faculty positions. More information can be found at https://grants.nih.gov/grants/guide/pa-files/PA-16-193.html.
As the current NICHD Basic Sciences Representative, I represent NICHD postdoctoral fellows at the FelCom meeting every month. Do you have a concern or question that you want brought up at the next meeting? Contact me at suna.gulay@nih.gov!

In the September FelCom meeting, the Mom-Dad-Docs community was advertised by the Childcare Board Liaison. This group meets monthly to provide support for and to discuss issues faced by scientist parents (postdocs, clinical fellows, graduate students). Consider joining their listserv (mom-dad-docs-l@list.nih.gov) and their events are always listed on the OITE’s upcoming events page.

If you live in (or are very familiar with) the Baltimore area, and you are community driven or looking for opportunities to contribute to society, the FelCom Service and Outreach subcommittee is looking to recruit a Baltimore co-chair. Contact Dr. Zelia Worman (zelia.worman@nih.gov) for more information.

Speaking of contributing to society, the Service and Outreach subcommittee is organizing a tree planting event with Casey Trees on October 21, 2017, in Washington DC. Contact Dr. Zelia Worman (zelia.worman@nih.gov) for more information.

Many of the other subcommittees (FARE, Career Development) are still recruiting members. The Career Development subcommittee started their events with a “Careers in Project Management” panel in September. Follow more of their activities through the events page of OITE (link above).

And of course, don’t forget about your own IC. We are welcoming new members to the NICHD Fellows Advisory Committee. The NICHD Retreat Planning Committee is also kicking off soon. Contact Dr. Yvette Pittman (yvette.pittman@nih.gov) for more information.
Scientific Retreat Image Competition Winner for 2017

Congratulations to Dr. Rosario Vicidomini, postdoctoral fellow in the Serpe lab, for winning the 2017 scientific retreat image competition.

The criteria by which image submissions were judged included composition, color palate, size and resolution, subject, overall image quality, and likeness to art versus a scientific figure.

Dr. Vicidomini’s picture is an excellent illustration of what can be done with modern light microscopes: visualize a fine structure extending over an area much larger than a single field of view. While the subject and technique presented here are of undoubted research interest, as mapping long-range neuronal connectivity is paramount to neurosciences, the final work is artistically compelling to any audience. The arrangement of images into two panels, each treated differently, creates a visually appealing image. And the high resolution of structural details in the image, crisp focus, range of light intensities, and striking use of color further add depth to the composition.

The Weinstein Lab won honorable mention this year for both exceptional quality of images and sheer volume of images submitted (10 total)! Some of the images were captured at especially high resolution, with amazing instruments.

Please join The NICHD Connection in congratulating Dr. Vicidomini and all honorable mentions on the exciting data, but more importantly for this issue, the impressive pieces of art.

NMJ motor neurons: Bundle of glutamatergic motor neurons (red) innervate the body-wall muscles of a fly larvae. They form several types of synaptic terminals: type Ib - large boutons (yellow in the left panel), type Is - small boutons (yellow in the right panel) and type II - long, thin terminals punctuated by tiny boutons.
Congratulations to the 2017 NICHD Mentors of the Year

The NICHD Mentor of the Year Award is an opportunity to recognize individuals whose mentoring has made a difference in someone’s life at NIH. The two mentoring award categories are fellows and investigators. Nominations were invited from all trainee groups in NICHD, and each nominator had to write a statement, on which the selection committee based its decisions. The selection committee included NICHD clinical and postdoctoral fellows, graduate students, and postbac fellows.

For the fellow mentoring award, the three finalists included:

» Dr. Vasilisa Aksenova, nominated by a postbac fellow, Alexandra Smith
» Dr. Amber Stratman, nominated by her mentor, Dr. Brant Weinstein, and three postbac fellows: Sofia Pezoa, Margaret Burns, Olivia Farrelly
» Dr. Afrouz Anderson, nominated by a postbac fellow, Kian Parsa

The fellow Mentor of the Year winner is Dr. Amber Stratman.

For the investigator award, the three finalists included:

» Dr. Tamás Balla, nominated by a graduate student, Elisa Arthofer
» Dr. Mary Dasso, nominated by serval trainees in her lab: Saroj Regmi, Vasilisa Aksenova, Shane Chen, Carlos Echeverria, Alexandra Smith, and Elizabeth Turcotte
» Dr. Alan DeCherney, nominated by several REI clinical fellows: Mae Healy, Nicole Banks, Jessica Zolten, Nicole Doyle, Shelley Dolitsky, Matt Connell, Toral Parikh, Justin Pilgrim, Katherine Green, Carter Owen and Terrence Lewis

The investigator Mentor of the Year winner is Dr. Tamás Balla.
Life Outside Lab

The 2017 Scientific Retreat

(continued)
October Announcements

NICHD ANNUAL POSTBAC COURSE: PROFESSIONAL DEVELOPMENT AND CAREER EXPLORATION

Postbaccalaureate fellows are important to our NIH scientific workforce, and NICHD currently has about 50 postbacs conducting both clinical and basic science research in one of our intramural laboratories. When postbacs leave the NIH for professional school or other endeavors, we want our postbacs to have had an enriched research experience while feeling excited about their chosen career paths.

**On October 16, our postbac course will begin!**

The course runs over lunchtime on Mondays, from 12 to 1 p.m., in the Clinical Center.

This unique, 8-week course is available for all NICHD postbacs, and the intent is to create a comfortable environment within a small group of peers to help postbacs improve analytical skills as scientists while expanding their knowledge of biomedical research and its relevance to human health.

In addition to three mini scientific lectures, we focus on postbac professional development: learning how to present science, exploring different career trajectories, ethical research practices in the lab, and interviewing for both medical and graduate school. Postdocs and clinical fellows within the institute will lead discussions designed to engage postbacs in the scientific rationale of a project, methodologies, and its significance to the field. A well-known public speaking coach, who has worked with our fellows for several years, will lead two modules on improving science communication skills and preparing for professional school interviews.

Additionally, a primary care physician will lead a session to share her experiences in practicing family medicine. We will host another session during which two former NICHD postdocs will shed light on their careers outside of academia and medicine.

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October Announcements  
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**NICHD ANNUAL POSTBAC COURSE (CONTINUED)**

*If you are interested in joining the class, please email Dr. Yvette Pittman at yvette.pittman@nih.gov. THERE ARE ONLY 10 SLOTS LEFT!*

The group will be limited to 25 students to allow maximum participation and interaction with the instructors. All participants must attend at least six of the eight classes, dates provided below.

<table>
<thead>
<tr>
<th>Course Date</th>
<th>Topic and Speakers</th>
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<tbody>
<tr>
<td>Oct. 16</td>
<td>Speaking about Science, Scott Morgan</td>
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<tr>
<td>Oct. 23</td>
<td>Ethics in Research Training: Making Good Choices in the Lab, Andy Kouse, PhD</td>
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<td>Oct. 30</td>
<td>Genomics and Mental Illness, Zelia Worman, PhD</td>
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<td>Nov. 6</td>
<td>Life as a Primary Care Physician, April Walker, MD</td>
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<td>Nov. 13</td>
<td>Careers Outside of Academia and Medicine, Michael Dambach, PhD, and Cheryl Bolinger, PhD</td>
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<td>Nov. 20</td>
<td>Reproductive Medicine and Infertility: Elevated progesterone during IVF cycles, Matthew Connell, MD</td>
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<td>Nov. 27</td>
<td>The Amazing Lysosome—A Suicide Bag and Much More, Maria Bagh, PhD</td>
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<tr>
<td>Dec. 4</td>
<td>Interviewing for Professional School, Scott Morgan</td>
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If you have any further questions, the course directors, Drs. Andy Kouse and Maria Bagh, will be happy to assist you (andy.kouse@nih.gov and maria.bagh@nih.gov).

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THE 2018 FELLOWS RETREAT PLANNING: AN OPPORTUNITY AWAITS!

You are invited to serve on the Steering Committee for planning the 14th Annual Meeting for postdoctoral, clinical, and visiting fellows and graduate students. Please send a quick note to Dr. Yvette Pittman (yvette.pittman@nih.gov), NICHD Office of Education, to express your interest.

The group builds the program for the meeting, invites speakers, reviews abstracts, selects fellow/student presenters, and moderates some of the sessions, among other responsibilities. It’s a great opportunity to sharpen your soft skills while working in a team to plan this annual spring event!

Our first committee meeting is scheduled for Monday, October 30, at 3:30 p.m. in Bldg. 31, conference room 2A48 (A-wing, 2nd floor).

NICHD FELLOWS ADVISORY COMMITTEE: SEEKING NEW MEMBERS!

The Office of Education formed an advisory committee in 2016, and we are seeking several more dedicated members to help us develop and initiate academic support programs for the institute. Both domestic and visiting fellows are needed. We want to achieve a broad representation, culturally and academically, so we can address the needs of all our trainees at NICHD. The committee meets monthly to exchange ideas and informally discuss ways we can enhance and tailor the training experience within the NICHD intramural program.

Some potential topics for our committee are how to:

» Increase the participation for training activities
» Expose fellows to various careers in science
» Identify teaching opportunities
» Identify internal and external research funding mechanisms
» Establish a structure for sharing scientific and career resources within the institute

The committee meets once a month on Thursdays, from 3:00 to 4:00 p.m. Our remaining Fall dates are listed below:

» October 12
» November 9
» December 7

Don’t miss this opportunity to serve your intramural NICHD community. Please contact Dr. Yvette Pittman at yvette.pittman@nih.gov if you are interested in joining the group.
October Announcements
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AAAS MASS MEDIA SCIENCE & ENGINEERING SUMMER FELLOWSHIP
Applications open October 16 – January 15!

From the AAAS Mass Media Fellowship website:
This highly competitive program strengthens the connections between scientists and journalists by placing advanced undergraduate, graduate, and postgraduate level scientists, engineers and mathematicians at media organizations nationwide. Fellows have worked as reporters, editors, researchers, and production assistants at such media outlets as the Los Angeles Times, National Public Radio, The Washington Post, WIRED, and Scientific American.

For 10 weeks during the summer, the Mass Media Fellows use their academic training in the sciences as they research, write and report today’s headlines, sharpening their abilities to communicate complex scientific issues to non-specialists. Participants come in knowing the importance of translating their work for the public, but they leave with the tools and the know-how to accomplish this important goal.

For additional information about the program visit aaas.org/mmfellowship
October Events

THURSDAY, OCTOBER 12, 3:00 – 4:00 PM
NICHD Fellows Advisory Committee meeting

The committee meets monthly to exchange ideas and informally discuss ways we can enhance and tailor the training experience within the NICHD intramural program. The committee meets once a month on Thursdays, from 3:00 to 4:00 p.m. Please contact Dr. Yvette Pittman at yvette.pittman@nih.gov if you are interested in joining the group.

MONDAY, OCTOBER 16, 12 – 1 PM
Annual Postbac Course: “Speaking about Science” with Scott Morgan
Clinical Center

If you are interested in joining the class, please email Dr. Yvette Pittman at yvette.pittman@nih.gov. There are only 10 slots left!

MONDAY, OCTOBER 30, 3:30 PM
Fellows Retreat Planning Committee meeting
Bldg. 31, conference room 2A48 (A-wing, 2nd floor)

Please send a quick note to Dr. Yvette Pittman (yvette.pittman@nih.gov) to express your interest. See announcements for more info.