Pathways to Expertise Programs
General Adult Psychiatry Residency Program
Hofstra Northwell School of Medicine

The research and innovations generated by our faculty, staff and trainees advance mental health worldwide. For trainees interested in pursuing an academic career as a clinical educator or leader, we offer research electives and a pathways programs to foster the development of a focused expertise. For those interested in a career as a physician investigator, we offer a dedicated research track. Both are described below.
In addition to its clinical services, North Shore-LIJ has long been recognized for its pioneering research. Through clinical and laboratory research conducted at the Feinstein Institute for Medical Research, a nationally recognized research center with more than 1,500 clinicians, scientists and staff, we are able to discover new treatment modalities, better understand disease, and discover better care delivery models.

Pathways to Expertise Program
One of the residency program’s primary missions is to graduate emerging leaders. The program believes that the best way to do that is by helping residents identify where ‘the passion of their heart overlaps with a need in the world’. The program’s professional development program support residents in this critical task through advising, support group, mentoring, critical reflection, and other activities.

But this is not enough. The program believes that a resident’s passion or calling, once identified, must also be nurtured into expertise. This requires a plan.

The Pathways to Expertise Programs (Pathways) allow each resident to develop an individually tailored set of experiences over the second, third, and fourth years. A pathway has the following components:

- Individually tailored to each resident’s chosen interest or focus
- Mentorship
- A series of elective experiences over the second, third, and fourth years of training
- Completion of a research or innovation project
- Presentation of the project at a regional or national meeting

Pathways are optional. Any resident may opt in. Pathways are not fixed but constructed by each trainee. Any theme relevant to psychiatry and of interest to the trainee may become the focus of a pathway. Currently, we have residents in pathways with a medical education focus and a perinatal psychiatry focus.

Resident Research Track Program
The Resident Research Track Program is an intensive pathway designed to train and support residents interested in becoming future leaders in translational, health services, and basic science research that will have a significant impact on mental health. The specific goal is to increase the number and quality of outstanding physician investigators skilled at leading multidisciplinary research teams.

This track is supported by the Department of Psychiatry and its Division of Research. Residents apply to the track during their intern year. Accepted residents receive protected time during their second, third, and fourth years to develop and implement a program of research.

The track includes didactics in research methods and statistics, a supportive environment, mentoring, and access to faculty who provide expertise and guidance in research design, measurement, study coordination, data management, biostatistical analysis, publishing and presenting research, and manuscript and grant writing. Graduates of the research track are positioned to pursue a career as a physician investigator.
The research track is situated within our research division and includes more than 100 members that includes principal investigators, fellows, trainees, and support staff. Multiple methodologies are employed including:

- genetics
- neuroimaging
- neuropsychology
- neuromodulatory techniques (e.g. ECT)
- animal models
- clinical trials
- health services/implementation research

This unique combination of expertise in clinical services and research provides an excellent opportunity for mentoring and nurturing a motivated resident’s growth toward a career as a physician-investigator.

**Highlights**

- 12 weeks of dedicated time for research during 2nd year of training in a single three month-long block or shorter, multiple blocks.
- 50 percent clinical time and 50 percent research time during third year of training.
- Up to 90 percent dedicated research time during 4th year of training
- Individually tailored methodology courses, including online courses, dependent on resident’s interests
- Regular meetings with a mentor
- Monthly work in progress sessions with the faculty director
- Opportunity to present at national meetings and attend a three day course co-sponsored by the American Society of Clinical Psychopharmacology

**Eligibility**

The research track welcomes psychiatry residents who have no or minimal exposure to scientific research in the past as well as those with substantial prior research experience (e.g. PhD).

*Limited Prior Experience:*
For those with limited experience the track offers the opportunity to develop strong foundational skills that may support future research efforts such as a subsequent research fellowship.

*Substantial Prior Experience:*
For more experienced candidates, the track offers development toward becoming an independent investigator with extramural funding.

Thus, the track allows residents to tailor their experience based upon their experience, interests, and goals with the time and support they need to successfully engage in both their clinical and research training.
The following criteria will be considered when selecting research track residents. Consideration of the resident’s prior experience with research will be taken into consideration and designated as limited vs. substantial.

1. Track Record: Creativity of the candidate and potential to lead excellent multidisciplinary research judging by track record in some or all of the following: leadership; areas of expertise and prior training; publications and presentations.

2. Research Plan: Scientific value of, potential clinical importance, and feasibility of the written multidisciplinary research plan.

3. Training Plan: Quality, appropriateness, and multidisciplinary complementarity of the proposed mentors, and plan for additional didactic and other training.

4. Resources: Likelihood that the department has the mentor and infrastructure to support the trainees proposed area of focus.

5. Career Potential: Global assessment of the likelihood that the candidate will develop a career as an outstanding investigator who will lead multidisciplinary teams and have an important impact on health.

Mentorship and sub-tracks

Independent of prior experience research interests of a resident are considered. Some examples of potential areas of study that can be pursued include the following:

1. Clinical study/psychopharmacology track

   **Principal investigator/mentor: Christoph U. Correll, MD, John Kane, MD**

   This track provides the opportunity to gain experience expertise with designing, conducting and analyzing clinical psychopharmacological studies.

   Recent or current examples of projects:
   a. Double blind randomized control study of aripiprazole vs. risperidone in first episode psychosis
   b. Double blind randomized control study of the effect of omega-3 fatty acid augmentation in first episode psychosis
   c. Effectiveness of ketamine vs. methohexital as anesthetic agent in ECT of major depression

2. Human analytic genetics track

   **Principle investigator/mentor: Todd Lencz, PhD**

   For residents who are interested in human genetics, bioinformatics, and its increasing impact on how we understand the biology, diagnosis and treatment of mental illnesses.

   Recent or current examples of projects:
   a. CYP2D6 polymorphisms and effects on metabolism of risperidone
   b. GWAS to explore links between predictors of general intelligence and the predictors of psychotic illness
   c. MHC gene variants and relationship to schizophrenia in the Ashkenazi population
3. Neuroimaging track

**Principal investigators/mentors: Katie Karlsgodt, PhD**

This track would facilitate conducting and analyze neuroimaging studies with techniques such as structural MRI, fMRI, DTI/DSI. Many projects in this lab are affiliated with other research areas, such as genetics (imaging genomics), or clinical trials (pharmacologic neuroimaging).

Recent or current examples of projects:

a. The effect of omega-3 fatty acids on the white matter integrity
b. The effect of impulsivity on neuroimaging markers in the early prodrome
c. Antipsychotic medication effects on resting state functional connectivity in healthy controls
d. The effect of ECT and on the human brain: resting state fMRI study
e. The effect of clozapine in schizophrenia: a longitudinal neuroimaging study.
f. Multimodal imaging of executive and reward networks across the psychotic spectrum in adolescents

4. Neuropsychology research track

**Principal investigator/mentor: Pam DeRosse, PhD**

This theme track will offer training in various aspect of neuropsychological measurement in mental disorders and how they interact with other research domains (imaging, genetics, etc).

Recent or current examples of projects:

a. The training effect in measuring cognitive performance
b. Neuropsychological characterization of the prodromal population
c. Multisite collaboration and analysis of the COGENT database

5. Animal research track

**Principal investigator/mentor: Eric Chang, PhD**

For the residents who are interested in more basic science research.

Recent or current examples of projects:

a. Mouse models of Alzheimer’s disease
b. Behavior analysis of schizophrenia gene knock in mice models

6. Implementation (Health Services) Research

**Principal Investigator: John Kane, MD**

For residents interested in implementation research that focuses on how to bridge the gap between best practice and actual practice.

Recent or current examples of projects:

a. Recovery After an Initial Schizophrenia Episode (RAISE) -- an NIMH research project on the trajectory and prognosis of schizophrenia treatment in the earliest stages of illness in order to reduce long term disability.
b. Improve Care and Reduce Cost (ICRC) – a large study interested in improvement of disease management via technology (e.g. cell phones, computerized pills) in schizophrenia to reduce overall morbidity and health care cost.
These are examples of tracks and provide a broad overview of research activities in the department. They do not encompass the entirety research endeavors of the department or include all principle investigators.

**Overall Program Requirements:**
- Application: initial statement of interest that addresses track record, proposal research plan, possible mentors, and proposed training plan.
- Meet regularly with their mentor and as needed with the faculty director of the RRTP.
- Complete relevant methods and biostatistics coursework.
- Develop and implement a program of research in close collaboration with your mentor.
- Participate in works in progress sessions with the faculty director.
- Attend weekly research seminars. This is either journal club discussion or a research presentation by visiting scholars.
- Update plan with progress report in the spring of the PGY-2 and PGY-3 Year.
- Attend national/international meetings and present your work at least one time at such a meeting.

### Research Track Milestones for Residents with Limited Research Experience

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<tr>
<th>Intern</th>
<th>PGY2</th>
<th>PGY3</th>
<th>PGY4</th>
<th>Goals</th>
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<tbody>
<tr>
<td>Explore your interest, your strength and weaknesses with research chief resident</td>
<td><em>First half:</em> find mentor, design a project <em>Second half:</em> IRB, start data collection</td>
<td>Continue data collection, data analysis, write a paper or an abstract.</td>
<td>Submit and publish a manuscript.</td>
<td>Possess expertise with at least one research methodology At least one publication Competitive for research fellowship</td>
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### Research Track Milestones for Residents with Extensive Research Experience

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<td><em>First half:</em> familiarize yourself with the opportunities, define a project, and find a mentor. <em>Second half:</em> prepare a proposal/IRB protocol for your project.</td>
<td><em>First half:</em> data collection and analysis <em>Second half:</em> begin writing a paper</td>
<td>Data analysis and collection continues; 1st published manuscript as a research track resident; New projects are started.</td>
<td>In addition to ongoing work, work toward applying for extramural grants, design projects for the future.</td>
<td>On way to becoming independently funded investigator</td>
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Timeline for the research track:

**PGY 1 year**
Research track residents are selected and recruited into the track. During the first half of the year, the program director will reach out to residents to inquire who in the class is interested in the research track. Residents wanting to pursue the track submit an application by March 1.

Early in the second half of the year, the program director and the faculty director for the RRTP interview candidates and decide who will be selected onto the track by April 1. The research chief resident meets with individuals to further explore their interests, strengths and weaknesses and facilitate interactions between residents and faculty members within the research department.

**PGY 2 year**
PGY-2 participants have 12 weeks of 100 percent, dedicated, time for research in either a three month-long block or several smaller blocks spread throughout the year. During these blocks there will be two individual weeks in which the research tracks residents will receive lectures by faculty members in the Division of Research in study design, data analysis/statistics and research methodologies in psychiatry. Lectures will include both theoretical and practical sessions and will include an overview of groundbreaking manuscripts which will be discussed.

Throughout the year, the resident will work with their mentor(s) on developing a project, obtaining IRB approval, and if possible, collecting/analyzing data. In addition to this, all research track residents will be offered to attend a three day course co-sponsored by the American Society of Clinical Psychopharmacology. This will be mandatory for residents whose interests are related to the clinical study/psychopharmacology theme. Additionally each research track resident will meet monthly with the faculty director and research track chief resident for work in progress sessions. In these sessions, goals of the resident’s project, mentorship, and other challenges will be discussed.

**PGY 3 year**
This year is individualized based on progress of the project and the theme of the resident’s research. While the third year of residency has an ambulatory focus, the research track resident’s time will be 50% clinical and 50% research.

To achieve this, the research track will have a reduced clinical load with fewer intake evaluations, will spend half of a year of geriatric outpatient clinic (instead of one whole year), will not attend the child and adolescent clinic, and will attend the substance abuse clinic one half-day (instead of 2) per week (in half of year not in geriatric clinic).

The animal research track residents will have blocked-off time from Friday afternoon to Tuesday morning and will have additional assistance with scheduling their outpatients. Each research track resident meets regularly with their mentor. Individual milestones will be determined based on the resident’s experience and research domain. Additionally each research track resident will meet monthly with the faculty director and research track chief resident for work in progress sessions. In these sessions, goals of the resident’s project, mentorship, and other challenges will be discussed. Every half-year, the resident will complete
an extra online course related to his interest of research (on Coursera or similar website, determined together with research chief).

**PGY 4 year**
50 to 90 percent of the resident’s time will be allocated to research-related activities; the remaining time will be dedicated to clinical duties. In addition to ongoing mentorship, the resident will complete educational activities tailored to their needs (e.g. one online course/year) similarly as in PGY3.

**Additional information on methodological training**
A critical function of the Research Division is to assist the Biostatistics and Data Management Unit in the training of investigators, particularly young investigators, in statistical methods, study design, and data management. This is accomplished by short seminars, full courses, and journal clubs, including:

- Introductory course in SPSS for statistical analysis is provided. Topics covered include: formatting data for input, labels, formats, as well as select SPSS syntax.
- Introductory course in research design and statistical methodology for research-track residents, fellows, and other trainees, led by Dr. Lencz.
- Formal seminars and courses offered to investigators, including: (1) Design of Case-Control Studies; (2) Design of Cohort Studies; (3) Design of Clinical Trials (Phase I, II, III, IV) including General Principles, Intention-to-Treat, Interim Analysis and Early Stopping and Sample Size Considerations; (4) Short Course in Biostatistics; (5) Fellows Course in Research Methods; (6) Estimation and Confidence Intervals; (7) Hypothesis Testing; (8) Regression and Correlation; (9) Survival Analysis; (10) Data Transformations; (11) Data Smoothing; and (12) Statistical Interactions in Medical Studies.

**Training in psychopharmacological clinical trials**
Every year the research department organizes a course on psychopharmacological clinical trials. This course is co-sponsored by the American Society of Clinical Psychopharmacology, Inc., the National Institute of Mental Health and The Zucker Hillside Hospital.

It is intended for physicians, PhDs, and other interested researchers in the pharmaceutical industry, clinical research organizations, foundations, governmental agencies or academic settings who are involved in psychopharmacology clinical trials and CNS drug development. The program directors of our general psychiatry and child and adolescent psychiatry residency programs send residents and fellows at least once during their training to participate in this 3-day clinical workshop.

The program focuses on the general problems and challenges of designing and implementing clinical trials with an emphasis on methodology. Topics include trial design, diagnosis, clinical assessments, patient ascertainment, and recruitment. It also reviews recent developments in psychotroopic drug research and ethical issues in the conduct of clinical trials. The organization of the course includes didactic sessions, discussion and interactive workshops.
Resident Research Projects

Multimodal Evaluation of Neurodevelopmental Disorders (MEND)
**Resident Participant: Bart Peters, MD**
Principal Investigator: Katherine Karlsgodt, PhD
Funding: NIH R01
2013-present
This project proposes the critical step of taking a longitudinal approach to understanding how neurodevelopmental changes impact complex, real-life behavior in both healthy individuals and those with severe psychiatric disorders. Furthermore, we propose to take a spectrum based approach to understanding differences in decision making in adolescence by relating specific symptom domains (regardless of diagnosis) to changes in specific neural circuits, an approach which ultimately may help us develop targeted treatments specifically tailored to the dynamic and developing brains of young adult patients.

Prolonging Remission in Depressed Elderly (PRIDE)
**Resident Participant: Miklos Argyelan, MD**
Principal Investigator: Georgios Petrides, MD
Funding: NIMH
2009-2015
The primary aim of this project was to compare, in a randomized clinical trial of patients with late-life depression, the relative efficacy, functional outcomes, and tolerability of two strategies to sustain antidepressant effect after successful acute treatment.

Dissecting Heterogeneity of Treatment Response of First Episode Schizophrenia (CIDAR)
**Resident Participant: Deepak Sarpal, MD**
Principal Investigator: Anil Malhotra, MD
Funding: NIH P50
2008-2014
The Zucker Hillside Hospital (ZHH) CIDAR integrated the extensive clinical experience of ZHH researchers focused on the treatment of first episode schizophrenia, with the expertise of investigators utilizing neurocognitive, neuroimaging, and molecular genetic approaches to identify biological predictors of treatment response and functional outcome. The ZHH CIDAR represented a unique opportunity to dissect the heterogeneity of treatment response in a first episode cohort with minimal or no prior antipsychotic treatment and that led to improved treatment as patients entered a critical phase of their illness.
Examples of Faculty Research Projects

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**Detecting Which Patients With Schizophrenia Will Improve with Omega-3 Treatment**
Principal Investigators: Delbert Robinson, MD and Philip Szeszko, PhD
Funding: NIH/NIMH R21
2013-2015
This study provided the necessary groundwork for determining whether omega-3 treatment should be targeted to select groups of patients with schizophrenia. The study examined whether erythrocyte membrane omega-3 concentration levels or brain white matter integrity assessed using the MR technique diffusion tensor imaging provided the means for identifying patients most likely to derive clinical benefit from omega-3 treatment.

**The Genetics of Psychosis: Towards a Dimensional Approach**
Principal Investigator: Pamela DeRosse, PhD
Funding: NIH R
2011-2015, after 2009-2011 pilot study
The research plan aimed to examine non-patient samples in an effort to elucidate the genetic underpinnings of the dimension of psychosis.

**Genetic Variation and Functional Disability in Schizophrenia**
Principal Investigator: Anil Malhotra, MD
Funding: NIH R01
2007-2013
This project aimed to identify the genetic variants that influence functional disability in schizophrenia using a 3-stage whole genome approach focused on the phenotypes of cognition and negative symptoms, which are key mediators of functional outcome in schizophrenia.

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