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Memorial Sloan Kettering  
Cancer Center

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## Single-Cell Analysis Learning Enrichment (SCALE) Course

### Single-Cell Analysis Learning Enrichment (SCALE) Course at Memorial Sloan Kettering for NYC-Area Researchers: 5-Day Intensive Workshop on Analyzing Single-Cell RNA-Sequencing Data

December 2-6, 2024

8:30am-5:30pm

Memorial Sloan Kettering Cancer Center

417 East 68<sup>th</sup> Street

New York, NY 10065

**Note: this course will only be offered in person.**

#### Overview of SCALE Course Goals

Memorial Sloan Kettering's Single-Cell Analytics Innovation Lab, Epigenetics Research Innovation Lab, and Office of Scientific Education and Training are pleased to offer a 5-day in-person course for 24 NYC-area researchers on analyzing single-cell RNA-sequencing data. Researchers will learn about current state-of-the-art computational methods to analyze single-cell data under the mentorship of expert MSK faculty and those centrally involved in single-cell RNA-sequencing analyses.

#### Details

The goal of this course is to increase participants' fluency in single-cell RNA-sequencing analysis and to provide concrete tools to tackle the most pertinent open questions in their research fields. Participants will be equipped to apply these lessons on single-cell analysis to their own data to enable correct biological interpretations. Participants will learn about the latest technologies and best practices of experimental methods and effective data generation, state-of-the-art algorithms used in single-cell data analysis, and tools for relating their computational results to make novel discoveries in their biological field.

The course will include detailed instruction on algorithms, applications of the analyses, and hands-on analysis, culminating in a group project and presentation re-creating a publishable figure from real-world single-cell data. Participants will receive daily personalized support and guidance from multiple leaders in the field and will have opportunities to build community and network with the instructors, guest lecturers, and fellow participants.

#### Schedule

December 2-6, 2024

Participants are expected to be on site each day from 8:30am-5:30pm. No lodging will be provided.

Each day will begin at 8:30am with a light breakfast. Lunch is on your own from 12:00pm-1:15pm, and afternoon coffee and sweets & fruit will be available at 3:00pm. There will be a morning Q&A session from 9:00am, and each day will end with a second Q&A session from 5:00-5:30pm.

## Day 1: Introduction to Single-Cell Data

- Introduction to the course
- Novel techniques in single-cell genomics
- Bulk RNA-seq introduction
- Experimental design for scRNA-seq
- Data structure and loading data onto Python, QC
- Pre-processing, normalizing data, feature selection, dimensionality reduction

## Day 2: Single-Cell Data Visualization

- Ambient noise correction
- Overview of single-cell RNA-sequencing and its impact over the years
- Graphical representation of data
- Clustering, Doublet Detection
- Visualization and interpretation of data
- Differential expression analysis

## Day 3: Cell Typing and Pseudotime Analysis

- Gene set enrichment analysis
- Cell typing
- Milo; SPECTRA; LIANA+
- scRNA-seq data and computation to study cellular behavior in disease context
- Pseudotime analysis
- Data denoising and imputation
- Beyond pedestrian scRNA-seq: Enrichment experiments

## Day 4: Multi-Sample Analysis and Batch Effect

- Loading multiple samples
- Detecting and correcting batch effect
- Novel computational tools for analysis of scRNA-seq, scATAC-seq, and beyond
- Reading methods in a single-cell paper with a critical eye
- Additional data wrangling

## Day 5: Hands-On Analysis to Recreate a Published Figure

Class is divided into groups, and each group spends the day working on their project and presenting to the class and the instructors

MSK Lecturers and Organizers



Eligibility



## Fees

- Academic/non-profit participants: \$750
- Industry participants: \$1100

**Note: You will be contacted regarding payment after you have been accepted into the course.**

## Important Dates

October 13, 11:59 p.m. EST: Deadline to apply; early applications are encouraged

October 21: 24 participants will be notified; payment will be requested at this time. A waitlist will be maintained

November 25: Deadline to complete pre-course survey; pre-course materials will be available upon survey completion

December 2: Course begins

December 6: Course ends

December 13: Deadline to complete post-course survey

## Application

[Apply Now](#)

You must apply by October 13, 11:59 p.m. EST to be considered for a spot in the course. Early applications are encouraged.

NOTE: The next SCALE course on December 2-6, 2024 is fully enrolled. We will update this webpage once we have any information about a 2025 course.

## Contact Us

If you have any questions about the SCALE course, or future course offerings, please email Office of Scientific Education and Training at [oset@mskcc.org](mailto:oset@mskcc.org) with "SCALE course" in the subject line.

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