

MIT Sean Collier Memorial

Situated on MIT's campus in honor of Officer Sean Collier who was shot and killed on April 18th 2013, the Collier Memorial marks the site of tragedy with a timeless structure—translating the phrase "Collier Strong" into a space of remembrance through a form that embodies the concept of strength through unity. The memorial is composed of thirty-two solid blocks of granite that form a five-way stone vault. Each block supports the other to create a central, covered space for reflection. Inspired by the gesture of an open hand, the memorial's shallow stone vault is buttressed by five radial walls, which extend outward toward the campus. The ovoid space at the center of the radial walls creates a passage, a marker, and an aperture that reframes the site.

The intersection of the star-shaped form and the central void creates a smooth, curved surface the underside of which acts as a bevel marker and reads "In the line of duty, Sean Collier, April 18, 2013." The longest walls of the memorial shelter the site from Vassar Street and simultaneously create an entry into the memorial. The two most acute walls are aligned with the location of the shooting just a few feet away. Carved into the south-facing wall is an epitaph from Sean's brother's eulogy, "Live long like he would. Big hearts, big smiles, big service, all love." Clusters of honey locust trees create a living canopy above the solid stone structure to mark the passage of time. In contrast, point lights set into the pavers permanently inscribe the constellation of stars in the sky the night of April 18th, 2013.

The design of the memorial combines age-old structural techniques for spanning masonry vaults with new digital fabrication and structural computation technologies to create an unprecedented form. The stone arch is among the most elemental of structural organizations, ordering materials in space and translating *force* into *form*. The design relies on the exact fit of the 32 stone blocks to transfer loads in pure compression from stone to stone. The shallowness of the massive stone vault overhead creates an effect of suspension and weightlessness, while the tapered geometry of the individual stone blocks that form the compression ring reveals the keystone geometry of the masonry arch.

The stone fabrication process involves the cutting of quarried blocks of stone, first with a single-axis robotic block saw, then with a multiple axis KUKA 500 robot. The vault geometry necessitates a perfect fit between blocks, and the robotic milling process produces final stone pieces that are within a 0.5 millimeter tolerance of the digital model. Methodologically, the design process for the Sean Collier Memorial involved a back and forth process between the construction of physical, analog, and digital models and simulations with digital tools. The massive stone blocks are then set on-site by masons through an intricate scaffolding sequence. The design showcases both new digital fabrication methods as well as traditional stone setting masonry techniques, celebrating both contemporary technology and timeless craft.

The vaulted design of the Sean Collier Memorial embodies structural principles in its material configuration and symbolizes generosity as service. This didactic visualization of forces is consistent with MIT's ethos of openness and transparency, while the idea that all five walls are needed to achieve a stable form is symbolic of a community coalescing to commemorate a loss. The permanent Collier Memorial offers the opportunity to remember Officer Sean Collier and honor his life and service, and represent shared values: openness in the face of threat, unity through diversity, and strength through community.

J. Meejin Yoon

PROJECT DESIGN TEAM

Design: Professor J. Meejin Yoon

Architect of Record: Höweler + Yoon Architecture LLP (Eric Höweler, Yoonhee Cho, Paul Cattaneo, Sungwoo Jang)

Specialty Masonry Consultant: Ochsendorf DeJong and Block Consulting Engineers (Prof. John Ochsendorf, Philippe Block, Matthew DeJong)

Structural Engineer of Record: Knippers Helbig- Advanced Engineering (Thorsten Helbig, Matthias Oppe, Tom Reiner, Florian Meier, Hauke Jungjohann)

Landscape Architect: Richard Burck Associates (Skip Burck, Robyn Reed)

Civil Engineer: Nitsch Engineering (David Conway, Michelle DiBenedetto)

Geotechnical Engineer: McPhail Associates (Ambrose J. Donovan, Brendan O'neil)

Lighting Designer: Horton Lees Brogden Lighting Design (Carrie Hawley, Barrett Newell)

Electrical Engineer: AHA Consulting Engineers (Mikus Veners)

Typographic Consultant: Francesca Bolognini

MIT Research Assistants: William Plunkett (SMBT '15), Corentin Fivet (Post Doctoral Associate), Euipoom Estelle Yoon (BSA '16), Anna Kaertner (BSA '15), Cecile Lu (BSA '16), Marianna Gonzalez (Wellesley BA '16)

CONSTRUCTION TEAM

Construction Manager: Suffolk Construction

Stone Fabricator: Quarra Stone Company, LLC

Granite Erector: Phoenix Bay State Construction Company

Granite Supplier (Quarry): Virginia Mist Group

Landscape Contractor: Valleycrest Landscape Development

Granite and Field Surveyor: Feldman Land Surveyors

Geotechnical Construction Company: Hayward Baker

Concrete Placement: G&C Concrete Construction

Paver Supplier: Hanover Pavers

Electrical Contractor: Gaston Electrical Co. Inc.

Construction Labor: Liberty Construction

Site Development Contractor: James W. Flett Co. Inc.(excavation work)

PROJECT MANAGEMENT TEAM

MIT Architecture

Project Manager: MIT Department of Facilities
Richard Amster, Director of Campus Construction
Paul J. Murphy, Program Manager, Special Projects
Jennifer Combs, Project Manager, Special Projects
Georgel Philbert, Project Assistant
Gianna Salvaggio, Project Assistant

COLLIER MEMORIAL COMMITTEE

The Collier Memorial design was refined through the work of a Sean Collier Permanent Memorial Committee, whose members are:

Martin Schmidt, Provost and Professor of Electrical Engineering (co-chair)
John DiFava, Director of Campus Services and Chief of Police (co-chair)
Kris Brewer, Technology Specialist, McGovern Institute for Brain Research
Sara Ferry, Graduate student, Nuclear Science and Engineering
Steven Hall, Professor of Aeronautics and Astronautics and Chair of the Faculty
Mark Jarzombek, Clarence H. Blackall Professor of the History and Theory of Architecture
Sally Miller, Undergraduate student, Mechanical Engineering
Kevin O'Connor, Patrol officer, MIT Police
Cheryl Vossmer, Captain, MIT Police