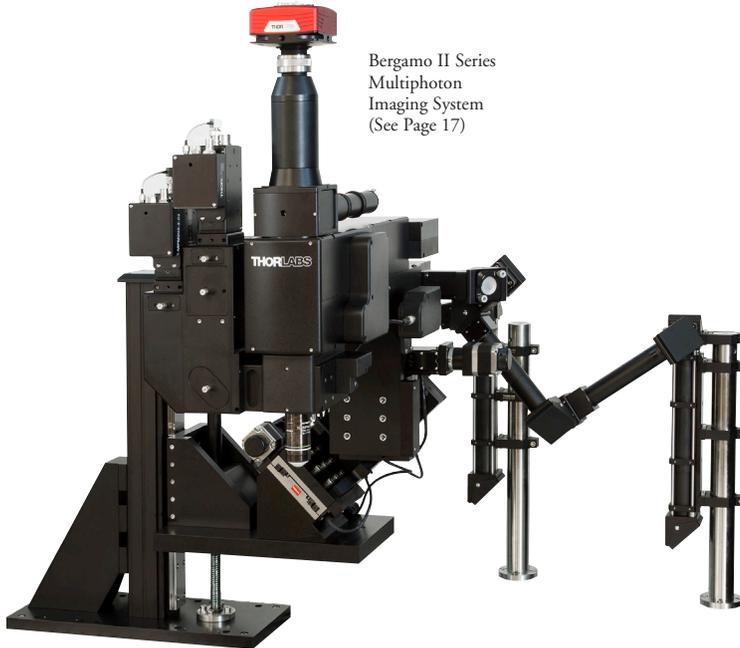


## Highlighted New Products



Bergamo II Series  
Multiphoton  
Imaging System  
(See Page 17)

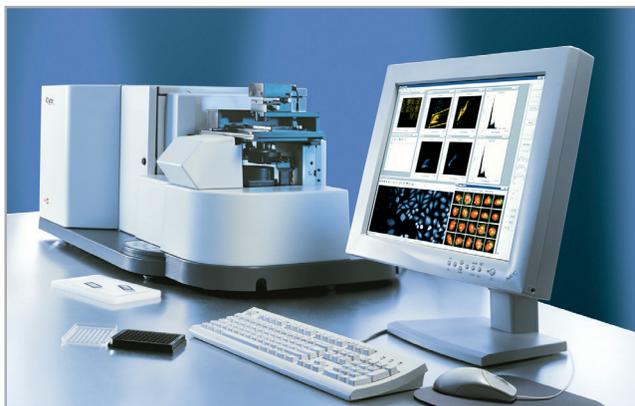


Optical Table  
(See Page 282)



Scientific  
CCD Camera  
(See Page 202)

Whole Slide  
Scanning (TDI)  
Imaging System  
(See Page 178)



iCyte® Automated Imaging Cytometer System  
(See Page 159)

## Introduction ▼

Thorlabs Worldwide	ii
Introducing Thorlabs	iii
Thorlabs Organizational Overview	iv

## Fluorescence Imaging ▼

Multiphoton Imaging	1
Confocal Imaging	48
Imaging System Components	60

## OCT Imaging ▼

OCT Systems	120
OCT System Components	130

## High Content Imaging ▼

Imaging Cytometry	158
Whole Slide Scanning	178

## Optical Tweezers ▼

Optical Tweezers System	190
Optical Tweezers Kit	194
Accessories	199

## Scientific CCD Cameras ▼

1.4 MP Cameras	206
4 MP Cameras	208
8 MP Cameras	210
VGA Cameras	212

## Electrophysiology ▼

Physiology Stages	220
Manipulators	234
Cerna Series Microscopes	239
Rigid Stands	244
Faraday Cage	248

## Optogenetics ▼

Light Sources	256
Fiber Optic Cables and Components	260
Cannula	262
Kits	270

## Workstations ▼

ScienceDesk Workstations	274
Optical Tables	282
Tabletop Isolation	288

## Accessories ▼

Microscope Components	292
Optomechanics	298
Microscope Objectives	312
Optical Components	316
Adaptive Optics	338
Illumination Sources	362
Light Detection	394
Alignment Tools	410
Laser Safety	414
Lab Supplies	427

## Indices ▼

Item Number	432
Subject	438

# Thorlabs Operations and Facilities

Founded in 1989 as a manufacturer of optical and optomechanical systems, Thorlabs experienced extensive growth during its early years of existence, enabling us to design, develop, and manufacture many of the building blocks needed by researchers in the photonics industry. Building upon our extensive knowledge of components, we ventured into designing ever more complex systems based on our components and subsystems, releasing our first Swept-Source Optical Coherence Tomography system in 2007.

As our growth continued, we have had the opportunity to add extensively to both our photonics and life science offerings in tandem. Today, our portfolio encompasses over 20,000 products, many of which are customer inspired. Those featured within these pages were hand selected for inclusion based on their relevancy to the life science community. We hope this "mini" catalog will allow you to conveniently view our products to locate the systems and components that best suit your needs.

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# Introducing Thorlabs...

If you're considering Thorlabs as a supplier of advanced imaging tools or related technologies, I'd like to introduce myself and my company.

I'm Alex Cable, the founder and President of Thorlabs Inc., based in Newton, New Jersey. Founded in late 1989 in a not-so-spare-bedroom turned lab space, Thorlabs today is a highly vertically integrated manufacturer of Photonic Tools, from components to complete instruments. The privately owned company serves a multitude of markets, and while you might think we are new to the Life Sciences, we have a history of serving your field by supplying tools to the instrumentation developers focused on building next-generation imaging tools. But certainly that's not where my company or I started.

After a rather circuitous path, which included being a farm manager, printer, machinist, and chef, I finally began my technical career at Bell Labs in 1985 after finishing an undergraduate degree in physics at Rutgers in my early 30's. As the breakup of Bell was just being driven through, and while there was a lot of uncertainty in the air, I enjoyed at least a few years of being part of what was still at that point a very unique research facility.

I was recruited into Steven Chu's lab by Steve during a recruiting trip he made to Rutgers. Steve seemed thrilled with my rather unorthodox career history, which I was expecting to be a big problem, especially my machining and welding skills. And while I had no way of knowing it at the time, I had the incredible good fortune to be part of what was to become a small team of researchers who opened up a new avenue of research within atomic physics with our seminal "optical molasses" atom trapping project. In 1997 the Nobel Prize in Physics was awarded to Steven Chu, Claude Cohen-Tannoudji, and William D. Phillips "for development of methods to cool and trap atoms with laser light."

In 1987, Steve decided to take a position at Stanford, and after weeks of agonizing over the tempting offer to follow him, I decided that my heart was really in doing a startup of some sort. In fact, at this point, I had already secretly begun to work in earnest to find a business opportunity.

Around this time, I also became a first-time home owner, purchasing a small 900 ft<sup>2</sup> ranch-style house in Freehold, NJ, which I dare say had no garage. Hence, I set up shop for my first foray into business in what should have been the master bedroom. Operating from this "spare" bedroom, and with the help of a college friend, who was an electrical engineer, we were able to design and build a vacuum-compatible Scanning Tunneling Electron Microscope (STM) netting approximately \$50,000 of which about \$20,000 was left after paying all the related expenses. This \$20,000 was shared with my college friend, netting me about \$7,000 after taxes. While we were able to sell a second STM in 1988, the second unit was significantly different from the previous system so it only netted us a few thousand dollars. But it was all about the experience; the next step was to really figure out how to not just have fun on interesting projects but also build a sustainable business with about \$10,000 in capital.

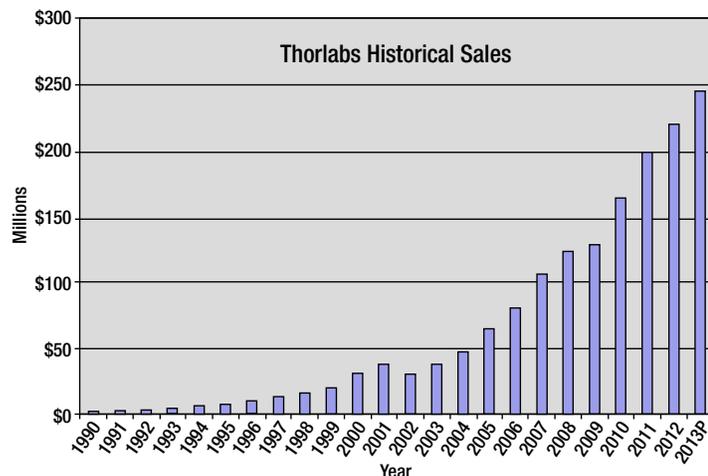


Figure 1b. Historical Sales for Thorlabs

scientific research customers: products that needed to perform as described and were readily available. Given that my personal roots are in manufacturing and research, and having been taught by a master, I totally embraced the need to deliver on these two commitments. And, it is these commitments that continue to drive our business today.

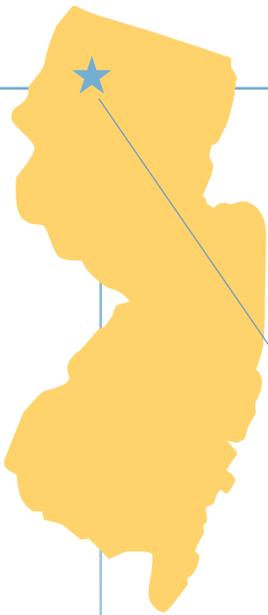


Figure 1a. Thorlabs' Photonics Catalogs

The transition to Photonics happened for two reasons: I was finding it very difficult to find other customers for the STM, and I simply enjoyed optics and lasers more than electronics and wanted Photonics to be in my future. This, coupled with a notion that Photonics would be a more innovative space in which to play, sent me in the direction that has resulted in Thorlabs being what it is today.

The early 1990's until about 1997 was a period of product line growth. We expanded our product line from a few hundred items to over 5,000 with sales reaching \$12 million in 1997. Each year Thorlabs expanded its catalog, as can be seen in Figure 1, which shows how our business grew during this period.

While our main competitors made a series of attempts to stall our growth, we were able to establish a defensible market position by understanding the needs of our core



# Newton, New Jersey

## Design, Manufacturing, & Distribution Facility

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[www.thorlabs.com](http://www.thorlabs.com)

Thorlabs was established in Newton, New Jersey over 20 years ago as a customer-centric organization aimed at offering those in the photonics community same-day shipment on standard optomechanical components. Since its inception, Thorlabs has grown to encompass mechanics, electronics, fiber, optics, and OCT imaging groups, all of which have grown in size and strive to serve both the life science community and our long-standing photonics customers.

Today, Thorlabs has a campus of five facilities in Newton, NJ, employing over 550 individuals. Among them is our new headquarters building, located at 56 Sparta Avenue in Newton, which opened in February 2013 and provides 125,000 square feet of office and manufacturing space. This manufacturing facility is home to a number of business units, each with its own set of competencies.



Thorlabs Headquarters in Newton, NJ

Next door to our headquarters, we have two buildings. One has an electronics and advanced systems lab, while the other is home to our laser systems division dedicated to creating laser systems, subsystems, and fully automated femtosecond lasers, which are used in linear and nonlinear biological probing and imaging applications. This team, in particular, works closely with our life science team to provide optimized laser solutions for the life sciences markets.



Fiber Draw Tower

#### COMPETENCIES

- Electronics, Imaging, and Software Development
- Machine Shop and Coating Chambers
- In-House Fiber Drawing
- American Distribution Hub
- Sales & Technical Support
- Marketing and Web Development
- Lean Manufacturing Capabilities and Synchronized Supply Chain

Through the efforts of our teams in Newton, we continue to serve the industrial optics and research communities by providing custom coatings as well as volume and prototype optics, drawing our own fiber including Indium and Zirconium Fluoride fibers.

We stock nearly all of our products, allowing for same-day shipment for these items. Our efforts to supply items for same-day shipment, combined with comprehensive customer support and service, are the pillars of our ability to meet our customers' needs.

Additionally, we continue to grow our 36,000 square feet of manufacturing space at our former headquarters facility located at 435 Rt. 206 in Newton, NJ. This space is shared between our machine shop and our mechanics departments who collaborate to provide on-site design and manufacturing processes, allowing us to customize our products quickly and efficiently to meet specialized customer requests.

Our Technical Support and Sales teams are on-call Monday through Saturday, with Technical Support available from 8 AM to 8 PM EST Monday through Friday and our Call Center available with hours from 8 AM to 8 PM EST Monday through Thursday, 8 AM to 7 PM EST Friday, and 9 AM to 1 PM EST Saturday.



The Veeco Spectro Coating Chamber is capable of ion beam sputtering.

# Sterling, Virginia

## R&D and Production Facility

Thorlabs Imaging Systems, located in Sterling, Virginia, is a 25,000 square foot R&D and production facility specializing in systems-level design and integration of imaging equipment tailored to the life sciences and biomedical communities. As one of our fastest growing groups, the VA team is currently 50 members strong and includes engineers in the mechanics, optics, electronics, and software disciplines, allowing us to be fully self-sufficient with respect to product design and development.

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**THORLABS**  
Imaging Systems



Thorlabs Imaging Systems Office

The team in Sterling derives the full benefits of a vertically integrated organization with decades of market expertise. Combining this breadth of knowledge with our extensive in-house design and fabrication capabilities allows the team to provide a market-driven product portfolio that pushes the boundaries of cutting edge technologies, while functioning at the capacity to meet the specific needs of our customers quickly and efficiently.

Our dedicated imaging platforms include stationary and articulated multiphoton microscopes, which provide the highest level of experimental flexibility in demanding imaging environments. Both offer exceptional speed, sensitivity, and high resolution, proving powerful aids to a broad range of researchers and life scientists. We also offer a compact, modular solution in the form of a confocal microscope,

### COMPETENCIES

- Custom Imaging Solutions
- On-Site Design and Manufacturing
- Dedicated Life Science Sales Personnel
- Micromanipulators Electrophysiology Platforms

designed with turnkey integration for commercial upright or inverted microscopes. Additionally, this team is responsible for producing a variety of focus blocks, objectives, adapters, and other accessories designed to support the needs of a diverse and ever-changing market.

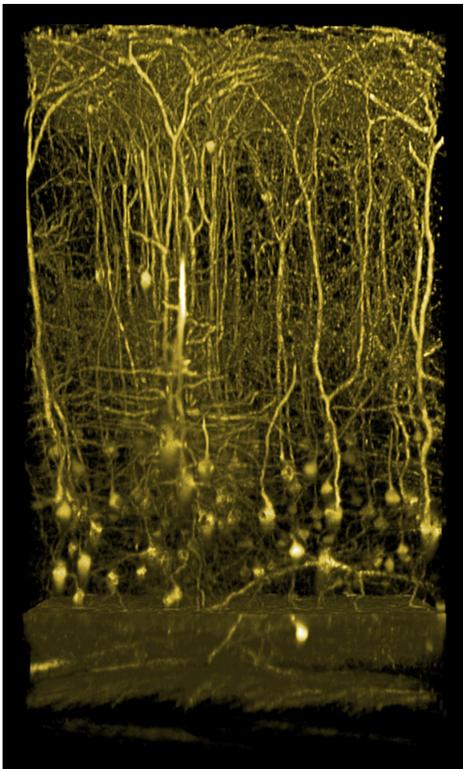
With the acquisition of the Burleigh® product line from Lumen Dynamics, our Virginia team added a wide range of manipulation and precision motion control equipment to their competencies. This equipment, including patch-clamp systems, piezoelectric micromanipulators, and high-stability microscope mounting solutions, enable ground-breaking biological and electrophysiology research and support manipulation on the cellular level and *in vitro* fertilization.



Thorlabs Imaging Systems' Demo Room

In early October 2013, Thorlabs acquired CompuCyte Corporation, further building its range of products to include laser scanning cytometry ("LSC") products for high-content cellular and tissue-based analysis. As this

expert team joins our family in Sterling, they will integrate into our extensive sales, technical support, and product development groups while bringing with them a new area of expertise. This technology, combining the advantages of digital microscopy, image processing, and cytometry to deliver high-content analysis of adherent cell and tissue specimens, will further benefit our life science team as they extend Thorlabs' presence in the biomedical field.



Deep tissue image of a primary somatosensory cortex in an 8-week-old mouse. This image, taken with our Bergamo Series microscope (see page 12), is courtesy of Dr. Hajime Hirase and Katsuya Ozawa, RIKEN Brain Science Institute, Wako, Japan.

Members of the Thorlabs Imaging Systems office frequently visit customers, providing on-site demonstrations of our various imaging systems. We also maintain a series of demo rooms around the world. These are equipped with both stationary and rotating multiphoton microscopes as well as confocal microscopes in various configurations.

Thorlabs' imaging team has sales engineers and field service staff based out of eight offices across four continents; all who endeavor to provide exceptional service through extensive knowledge and personal interaction with our life science and biotechnology customers, ensuring their needs are well met. This dedicated team, managed from our northern CA sales office, is familiar not only with our life science equipment but also with Thorlabs' entire portfolio, enabling them to provide assistance and solutions in many areas.



# Austin, Texas

## Design & Manufacturing

### Thorlabs Scientific Imaging (TSI)

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Austin, TX 78744

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In 2011, Thorlabs acquired Austin-based DVC Company and started its Thorlabs Scientific Imaging (TSI) group, which is dedicated to the design and manufacture of low-noise, high-sensitivity CCD cameras. With an eye towards creating a modular platform, the engineers at TSI work in a multidisciplinary environment that brings together challenging circuit design, optical and mechanical innovation, firmware, and software to develop a camera platform that can be used with a variety of imagers. The result is a growing portfolio of leading-edge products.

This dedicated team combines years of experience and engineering

capabilities to bring to market imaging solutions for all applications in the life sciences, including high-end optical systems and microscopy. One of their most recent products is a TDI Microscope system, which eliminates the relative motion between a slide and the charge pattern on an image sensor so fluorescence and brightfield slides can be scanned without stopping the motion of the slide. In order to best suit our customers' needs, this product is offered with a commercial microscope but is also be sold as a cost-effective kit, which may be added to an existing microscope.

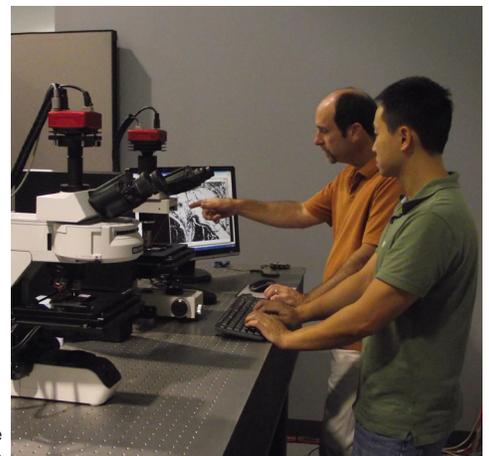


Thorlabs Scientific Imaging Office

#### COMPETENCIES

- Design and Manufacturing
- Software and Firmware Development

**THORLABS**  
Scientific Imaging



Come Visit the  
Demos in Our Office

# Jessup, Maryland



## Design & Manufacturing Facility



Thorlabs Quantum Electronics Office

Thorlabs manufactures a broad variety of active optoelectronic components at our Thorlabs Quantum Electronics (TQE) division located in Jessup, MD. Here at our 40,000 square foot state-of-the-art semiconductor manufacturing facility, the team has vast knowledge in material science, device design, wafer growth and fabrication, and electro-optic device packaging.

Supported by a vertically integrated manufacturing infrastructure, our TQE facility produces high-performance optoelectronic devices and modules for the life science, telecommunications, medical, industrial, and defense markets.

Our team's expansive knowledge and attention to customer satisfaction allow us to pioneer and manufacture market-leading optoelectronic products such as semiconductor laser diodes, semiconductor optical amplifiers, optical modulators, and tunable MEMS-VCSEL lasers. Each of our products reflects the commitment and unwavering persistence to bring industry-leading elements to the photonics and life science markets.

### Thorlabs Quantum Electronics (TQE)

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### COMPETENCIES

- In-House Epitaxial Wafer Growth and III-V Semiconductor and Lithium Niobate Wafer Fabrication
- Sub-micron Photolithography
- Precision Anti-Reflection (AR) Optical Coating
- In-house Reliability Testing
- Hermetic, Flux-Free Optoelectronic Packaging
- On-Site Sales Team

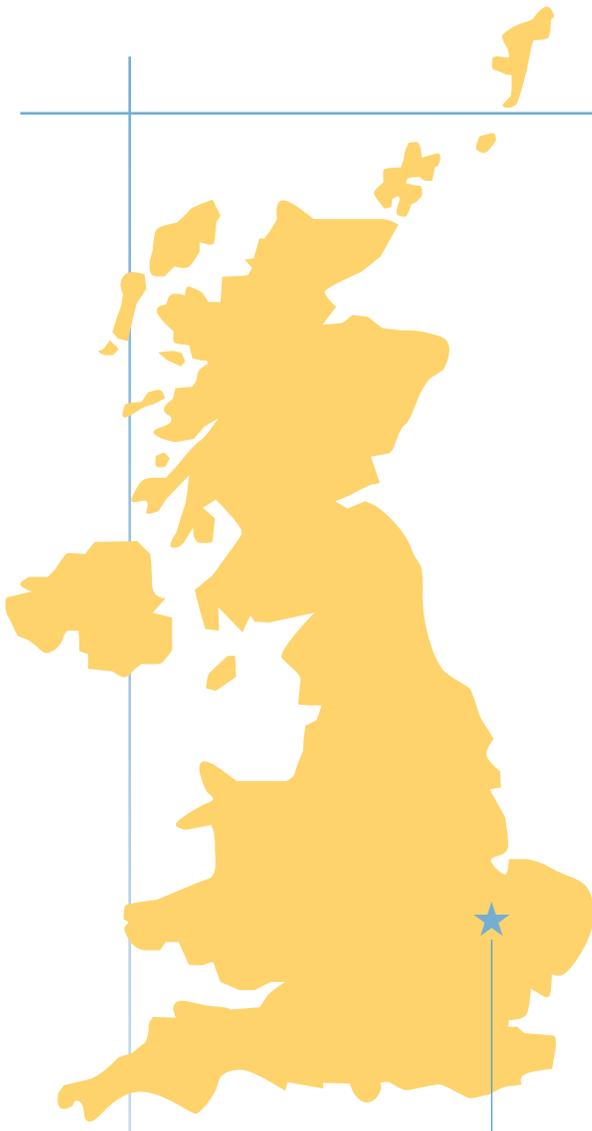
Here at TQE, we also directly manufacturers many of the key optical components that are at the heart of complex life science and bio-science instruments, such as semiconductor laser light sources and precision metrology targets. This facility also has epitaxial wafer growth, wafer fabrication, and packaging capabilities for group III-V (InP, GaAs, GaSb) semiconductor laser devices, Mid-IR Quantum Cascade and Interband Cascade Lasers (QCLs and ICLs), and Lithium Niobate (LiNbO<sub>3</sub>) electro-optic modulators.

Our on-site sales team, available from 8 AM to 6 PM EST, is eager to assist in custom projects and special contracts.

**THORLABS**  
Quantum Electronics



Cleanroom Inspection Area



# Ely, United Kingdom

## Design, Manufacturing, & Technical Support Facility

At our 27,000 square foot facility in Ely, the Thorlabs team is dedicated to manufacturing our vibration-isolation and motion control offerings, such as our ScienceDesk™ and Nexus™ workstations as well as our microscopy stages. Located in close proximity to leading research campuses, we benefit from many fruitful discussions and collaborations with nearby scientists.

The Ely office is also home to some of our European service engineers for our imaging systems as well as a demonstration facility where customers can see and use our laser scanning microscopes and related life science products.

With over 130 employees, the UK office provides on-site Sales and Technical Support to our customers between the hours of 8 AM and 5:30 PM GMT. Same-day shipping is available for all stocked items.



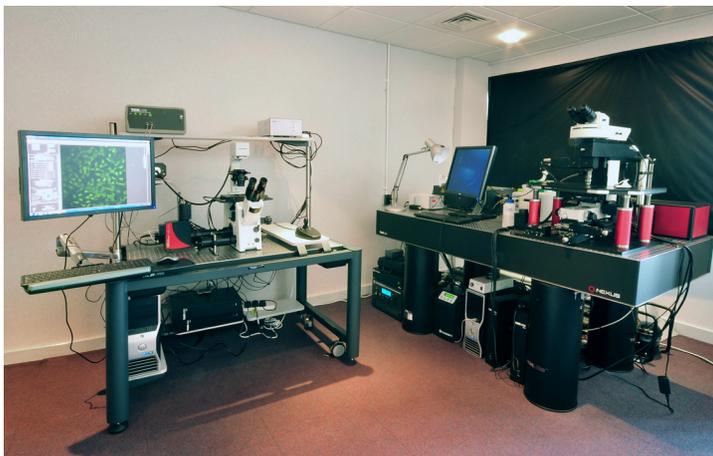
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Our Ely Demo Room

### COMPETENCIES

- Vibration Isolation Systems
- Motion Control Equipment
- Precision Nanopositioning
- Closed-Loop Feedback and Auto Alignment Nanopositioning
- Technical Support and Sales
- Demonstration Room



Optical Tables Manufacturing

The team in Ely specializes primarily in the design and manufacturing of high-precision motion control systems as well as vibration isolation solutions for the photonics and life sciences industries. Research and development, as well as manufacturing of motion control systems, is all done on site, allowing us to more effectively meet customer needs. Over the past decade, we have expanded our manufacturing competencies to address the needs of those working in microscopy to include precision closed-loop XY stages, piezo-driven Z stages, and piezo objective mounts.

The vibration isolation design and manufacturing facilities in Ely utilize high tolerance CNC bridge mills to achieve the tight tolerances we offer on our optical table designs. These manufacturing processes, combined with a homogenous selection of metals, ensure an athermal design and provide some of the best performance and stability in the industry. Our newest range of support platforms, the Nexus line, includes our table frames, as well as imperial- and metric-tapped tabletops.



Our MLS203 Fast Scanning XY Stage



ScienceDesk™ Anti-Vibration Work Station



Nexus Line of Tables

# Dachau/Munich, Germany

Design, Manufacturing,  
Technical Support, Sales,  
& Distribution Facility

Our team in Germany specializes in the development and manufacturing of optoelectronic devices. The offices in Dachau and Lübeck employ roughly 100 people and encompass over 26,000 square feet of office, laboratory, and warehouse space. Our Munich office is equipped with a demonstration center where customers can test products and meet with specialists.

The technical sales and support team is dedicated to providing exceptional service and solutions for our European Customers.

To that end, we offer on-site Sales and Technical Support between the hours of 8 AM and 6 PM CET, providing our photonics and life science communities with comprehensive and expert support.



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Our OCT System at a Tradeshow

## COMPETENCIES

- Engineering, Manufacturing, and Logistics Center
- SD-OCT Design and Customization
- Multi-Cultural and Multi-Lingual Customer Support Team
- Lean Manufacturing Capabilities and Synchronized Supply Chain
- European Distribution Hub

# Maisons-Laffitte, France

Technical Support, Sales,  
and Order Processing Facility



Located 20 kilometers from Paris, Thorlabs' facility in Maisons-Laffitte, France provides comprehensive Technical Support, Technical Sales, and Order Processing services in the French language from 8 AM to 6 PM CET. The office was opened in response to our growing European customer base and the desire to serve them more efficiently.

Our French office is supported by our worldwide engineering group for immediate technical assistance and by our European distribution hub, enabling same-day shipment for over 95% of Thorlabs' product portfolio.



Thorlabs' France Office

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France

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**Fax:** +33 (0) 825 744 800

**Email:** sales.fr@thorlabs.com

## COMPETENCIES

- Technical Support & Sales
- Order Processing in French
- European Distribution and Same-Day Shipment



Stop by Thorlabs' Tradeshow Booth to  
See Our OCT Systems Live



# Tokyo, Japan

## Sales & Technical Support Facility

### Thorlabs Japan Inc.

Higashi Ikebukuro  
Q Building 1F 2-23-2  
Higashi-Ikebukuro, Tokyo  
170-0013

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**Email:** sales@thorlabs.jp

Thorlabs' Japanese office is centrally located in the city of Tokyo. Here we employ 40 individuals, each of which is passionate and dedicated to the Asian photonics and life sciences markets. We have office hours between 9 AM and 6 PM, JST, with a Technical Support team devoted to assisting customers on a daily basis with their individual needs.



Thorlabs Japan Office

### COMPETENCIES

- On-Site Optical System Showroom Focused on Optical Coherence Tomography, Beam Diagnostics, and Optomechanical Hardware Systems
- Rare Earth Optical Fiber Specialists
- Laser Diode and Passive Component Sourcing



Our Demo Room in Japan

This sales office has a demonstration showroom that offers customers an opportunity to view a broad range of Thorlabs' life science products. Here, customers gain hands-on interaction with products such as our multiphoton and confocal microscopes, MLS stages, LEDs and drivers, CCD cameras, optical coherence tomography systems, and optical trap.



Our Busy Tokyo Sales Office

Our Tokyo team is devoted to helping Thorlabs by providing an Asian sales channel for our life science offices in the United States and Europe. We have also translated the Thorlabs website into Japanese for the convenience of those customers who prefer to view our product information in the local language.

As of January 2012, Thorlabs' Japanese office opened their very own warehouse, allowing our customers to enjoy same-day shipping for stocked products.

# Göteborg, Sweden

## Design, Manufacturing, and Sales Facility

Located in Göteborg, Thorlabs Sweden AB employs 26 individuals who specialize in designing, testing, and manufacturing optical systems, including objectives, scan lenses, and collimation packages. Our new line of optical

spectrum analyzers is also developed at this facility. The team has extensive experience with optical and mechanical design, software development, electronics, and systems development.

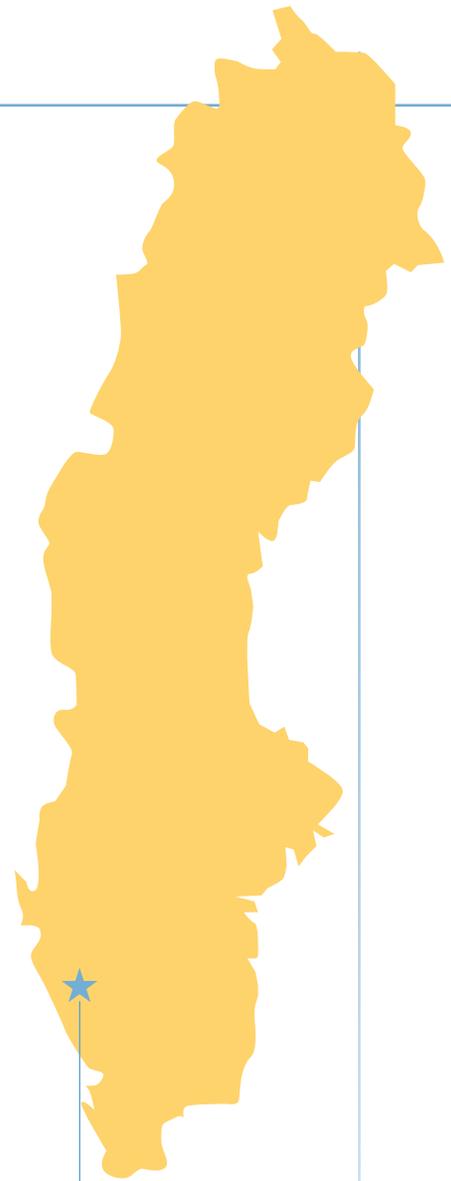
Our optical systems engineers frequently receive requests to manufacture specialized OEM equipment and high-quality custom products tailored to the evolving needs of those working in the life sciences. Their expertise in optical system design was instrumental in developing the scan lens utilized in the scan head of our OCT imaging systems.

The Sales and Technical Support teams are available from 8 AM to 5 PM CET to support customers in Sweden,

Norway, Denmark, Finland, Estonia, Latvia, Lithuania, and Poland. We are located in a 10,700 square foot facility that includes a production area, cleanroom, and development laboratories. The cleanroom, coupled with our specialized testing capabilities is well suited for manufacturing and testing of high-end optical systems.



Thorlabs Sweden Office



### Thorlabs Sweden AB

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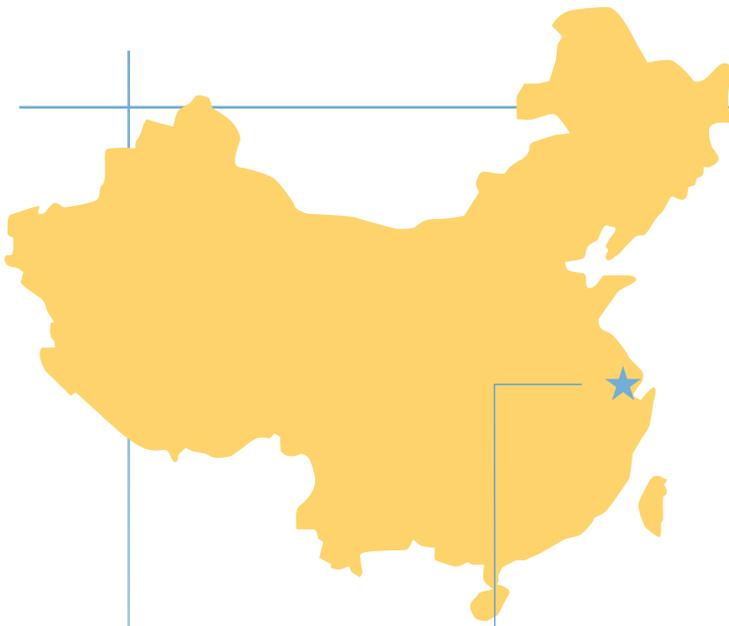
LSM03  
OCT Scan Lens

### COMPETENCIES

- R&D for Scan Lenses, Focusing Objectives, Collimation Packages, Optical Spectrum Analyzers, Beam Expanders, and Fabry-Perot Interferometers
- Instrument Design, Assembly, and Alignment



Thorlabs' reflective microscope objectives are designed, manufactured, and tested in our Sweden Facility



# Shanghai, China

Design, Manufacturing,  
Technical Support,  
& CR Sales Facility

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In 2009, Thorlabs expanded its presence to Shanghai, China where our Sales, Technical Support, and Design team has grown to 70 employees. Here at our 20,000 square foot facility, our Sales and Technical Support staff are available from 8:00 AM to 6:00 PM CST. This facility is also home to a new manufacturing center, warehouse, design team, and demonstration lab.



Thorlabs China Office

Our Shanghai office provides our Asian customers with an opportunity to discuss our life science and photonics products with knowledgeable staff and to gain hands-on exposure via a visit to our demonstration lab. Here, customers are able to see and interact with fully functioning multiphoton imaging systems, a confocal microscope, our Telesto Spectral-Domain OCT system, as well as other microscope accessories.

## COMPETENCIES

- Dedicated Pacific-Asia Sales and Support Team for Imaging Systems
- Training and Testing Platforms for Multidisciplinary Experiments, Including Optogenetics, Optical Trapping, and Polarization Imaging
- Specialties in Advanced Liquid Crystal Technologies Such as Tunable Filters
- R&D and Manufacturing in Piezo Actuators, Optics, and Broadband Light Sources



Our Demonstration Room Includes this Micromanipulator Setup

# São Carlos, Brazil

Design, Manufacturing,  
& Sales Facility



Thorlabs Brazil Office

In April 2012, Thorlabs extended its worldwide presence when we announced the addition of an office in São Carlos, Brazil. This office, centrally located in the state of São Paulo, is dedicated to supporting the photonics and life science community of South America. Our team, comprised of 5 individuals, leverages their knowledge of the

industry to provide technical and sales support to our customers throughout the continent.

This team, focused on promoting our current products throughout the region, is dedicated to developing a strong local presence in and around Brazil through university visits, local tradeshow, and personal interaction. Through this approach, we are providing a convenient and familiar link between our South American customers and our life science team in Sterling, VA.

Our Brazilian team members provide administrative, export, and compliance guidance to our life science teams, which allows the organization to easily liaise between North and South America, all while growing our presence throughout the region.

## Thorlabs Ltda, Brazil

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13560-110 Brazil

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## COMPETENCIES

- Technical Sales and Support
- On-Site Demo Room



The Brazil Demo Room Includes an Opportunity to See Our LEDs, Light Sources, and Detectors