

**2016-2017 Facility Rates & Expense Caps**

The Carnegie Mellon Nanofabrication Facility rates for the 2016-2017 fiscal year are listed in the following tables. Carnegie Mellon internal users are charged at the “Carnegie Mellon Users” rate. External corporate users are charged at the “External Corporate Users” rates shown in the right hand column of the rate table. Users from external 501(c)(3) charitable organizations and U.S. Federal, state, or local government organizations are charged at the “Carnegie Mellon Users” rate.

<b>NANOFAB FEES / SERVICES</b>	<b>CARNEGIE MELLON USERS</b>	<b>*EXTERNAL CORPORATE USERS</b>
Entry Fee	\$20.00/Day	\$33.7/Day
Nanofab Training Fee	\$25.00/Hour	\$42.13/Hour
Nanofab Process Development/Labor	\$50.00/Hour	\$84.25/Hour
Model Shop	\$25.00/Month	\$42.13/Month
Wafer Dicing Service	\$85.00/Hour	\$143.23/Hour

<b>THIN-FILM DEPOSITION TOOL RATES</b>	<b>CARNEGIE MELLON USERS</b>	<b>*EXTERNAL CORPORATE USERS</b>
Anatec Gold Coater	\$50.00/Run	\$84.25/Run
Nanofab 6-Target Co-Sputtering System	\$75.00/Run	\$126.38/Run
Commonwealth Scientific Ion Beam Deposition System	\$75.00/Run	\$126.38/Run
CVC Connexion Sputtering System	\$75.00/Run	\$126.38/Run
Leybold-Heraeus Z-400 Sputtering Systems #1 & #2	\$75.00/Run	\$126.38/Run \$126.38/Run
Leybold-Heraeus Z-650 Sputtering System	\$75.00/Run	\$126.38/Run
Nanofab Sputtering Systems #1 - #5	\$75.00/Run	\$126.38/Run
Aluminum Nitride Deposition System	\$75.00/Run	\$126.38/Run
Perkin Elmer 2400 6J Sputtering System	\$75.00/Run	\$126.38/Run
Perkin Elmer 2400 8L Sputtering System	\$75.00/Run	\$126.38/Run
Cambridge Nanotech Fiji ALD System	\$75.00/Run + Precursor	\$126.38/Run + Precursor
Trion Orion II PECVD System	\$75.00/Run	\$126.38/Run
Ultek E. Beam Evaporator	\$75.00/Run	\$126.38/Run
Copper Electroplating System	\$50.00/Run	\$84.25/Run
Tegal AMS AIN Sputtering System	\$75.00/Run	\$126.38/Run
Angstrom Engineering Covap II Thermal Evaporator	\$75.00/Run	\$126.38/Run
SCS Labcoter 2 Parylene Deposition System	\$50.00/Run	\$84.25/Run

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Carnegie Mellon University  
5000 Forbes Avenue  
ECE Department - Nanofab  
Pittsburgh, PA 15213

PHONE (412) 268-2471  
FAX (412) 268-4323  
E-MAIL ccbowman@ece.cmu.edu  
WEB SITE www.nanofab.ece.cmu.edu

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ETCHING, POLISHING, & DICING TOOL RATES	CARNEGIE MELLON USERS	*EXTERNAL CORPORATE USERS
Commonwealth Scientific Ion Beam Etching Systems #1 & #2	\$75.00/Run	\$126.38/Run
IPC Barrel Etcher	\$20.00/Up To A 15 Minute Run	\$33.70/Up To A 15 Minute Run
	\$35.00/Up To A 30 Minute Run	\$58.98/Up To A 30 Minute Run
	\$50.00/Up To An Hour Run	\$84.25/Up To An Hour Run
	\$10.00/Each Additional Hour Per Run	\$16.85/Each Additional Hour Per Run
Micrion 2500 Focused Ion Beam System	\$75.00/Hour	\$126.38/Hour
Plasma-Therm 790 RIE System	\$25.00/Up To A 15 Minute Run	\$42.13/Up To A 15 Minute Run
	\$40.00/Up To A 30 Minute Run	\$67.40/Up To A 30 Minute Run
	\$65.00/Up To An Hour Run	\$109.53/Up To An Hour Run
	\$10.00/Each Additional Hour Per Run	\$16.85/Each Additional Hour Per Run
Surface Technology Systems Multiplex ICP RIE Aspect Cluster ICP RIE / AOE	\$30.00/Up To A 15 Minute Run	\$50.55/Up To A 15 Minute Run
	\$50.00/Up To A 30 Minute Run	\$84.25/Up To A 30 Minute Run
	\$75.00/Up To An Hour Run	\$126.38/Up To An Hour Run
	\$25.00/Each Additional Hour Per Run	\$42.13/Each Additional Hour Per Run
SPTS Primaxx Uetch Vapor HF Etcher	\$20.00/Cycle up to 4 Cycles	\$33.70/Cycle up to 4 Cycles
	\$5.00/Each Additional Cycle after 4 Cycles	\$8.43/Each Additional Cycle after 4 Cycles

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ETCHING, POLISHING, & DICING TOOL RATES (CONTINUED)	CARNEGIE MELLON USERS	*EXTERNAL CORPORATE USERS
Plasma-Therm Versaline ICP RIE	\$30.00/Up To A 15 Minute Run	\$50.55/Up To A 15 Minute Run
	\$50.00/Up To A 30 Minute Run	\$84.25/Up To A 30 Minute Run
	\$75.00/Up To An Hour Run	\$126.38/Up To An Hour Run
	\$25.00/Each Additional Hour Per Run	\$42.13/Each Additional Hour Per Run
Trion Phantom II RIE System	\$25.00/Up To A 15 Minute Run	\$42.13/Up To A 15 Minute Run
	\$40.00/Up To A 30 Minute Run	\$67.40/Up To A 30 Minute Run
	\$65.00/Up To An Hour Run	\$109.53/Up To An Hour Run
	\$10.00/Each Additional Hour Per Run	\$16.85/Each Additional Hour Per Run
Micromech Diamond Saw	\$45.00/Run	\$75.83/Run
Strasbaugh 6EC CMP	\$50.00/Hour	\$84.25/Hour
Ultratech Scrubber	\$25.00/Run	\$42.13/Run
Tousimis Critical Point Dryer	\$50.00/Run	\$84.25/Run

METROLOGY / INSPECTION TOOL RATES	CARNEGIE MELLON USERS	*EXTERNAL CORPORATE USERS
Olympus MX80 Microscope With Optronics Digital Camera System	\$25.00/Day	\$42.13/Day
Nanometrics Nanospec 210XP	\$40.00/Hour	\$67.40/Hour
Tencor Alpha-Step 200 Profilometer	\$40.00/Hour	\$67.40/Hour
Tencor Flexus Stress Measurement System	\$50.00/Hour	\$84.25/Hour
KLA-Tencor P-2 and P-15 Profilometers	\$50.00/Hour	\$84.25/Hour

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LITHOGRAPHY TOOL RATES	CARNEGIE MELLON USERS	*EXTERNAL CORPORATE USERS
Nikon NSR G4 Wafer Stepper	\$75.00/Hour	\$126.38/Hour
Karl Suss MJB3 Mask Aligner	\$50.00/Hour	\$84.25/Hour
Karl Suss MA56 Mask Aligner	\$60.00/Hour	\$101.10/Hour
Karl Suss MA6 Mask Aligner	\$70.00/Hour	\$117.95/Hour
Hot Pack Vacuum Oven	\$25.00/Run	\$42.13/Run
YES HMDS Vapor Prime Oven	\$25.00/Run	\$42.13/Run
FEI Sirion SEM with Naby E. Beam Lithography System #1 & #2	\$75.00/Hour	\$126.38/Hour
Heidelberg DWL 66 and Heidelberg DWL 66FS	1st hour: \$50	1st hour: \$84.25
	2nd hour: \$25	2nd hour: \$42.13
	3rd hour: \$10	3rd hour: \$16.85
	4th – 24th hour: \$5/hour	4th – 24th hour: \$8.43/hour
	25th hour: \$50	25th hour: \$84.25
	26th hour: \$25	26th hour: \$42.13
	27th hour: \$10	27th hour: \$16.85
	28th – 48th hour: \$5/hour	28th – 48th hour: \$8.43/hour

FURNACE / ANNEALING TOOL RATES	CARNEGIE MELLON USERS	EXTERNAL USERS
Magnetic Field Vacuum Annealer	\$50.00/Run	\$84.25/Run
Vapor-Temp Relative Humidity Chamber	\$25.00/Run	\$42.13/Run
AG Associates Rapid Thermal Annealer	\$50.00/Run	\$84.25/Run
Annealing Furnace	\$25.00/Run (Without Gas)	\$42.13/Run (Without Gas)
	\$50.00/Run (With Gas)	\$84.25/Run (With Gas)
Lindberg Box Furnace	\$25.00/Run	\$42.13/Run
Oxidation Furnace	\$150.00/Run	\$252.75/Run
Thermcraft 2" Barrel Furnace	\$50.00/Run (Without Gas)	\$84.25/Run (Without Gas)
	\$75.00/Run (With Gas)	\$126.38/Run (With Gas)

**Hourly Rates**

Machine time for hourly equipment is logged to the nearest tenth of an hour and totaled monthly. Although there is no minimum charge per day, there is a half hour minimum charge per month.

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The Heidelberg DWL 66/66FS, IPC Barrel Etcher, Plasma-Therm 790, Plasma Therm Versaline, Surface Technology Systems Aspect Cluster RIE/AOE System, Surface Technology Systems Multiplex ICP RIE System, SPTS Primaxx Uetch Vapor HF Etcher, and Trion Phantom II RIE System have a tiered rate structure as shown on the rate table. The tiered rates are available for consecutive run times only.

The Micrion 2500 Focused Ion Beam System is reserved for a minimum of two hours per day. Users may share a two hour reservation. Operation of the machine may continue at the end of a user's two hour reservation, in one hour increments, if the machine is otherwise available.

**Atomic Layer Deposition Precursor Fee**

Atomic layer depositions are subject to an additional fee to compensate for the high cost of the precursors. A charge of \$5.00 per 10 nm of film thickness will be added to the cost per run.

**Precious Metal Fees**

Precious metal thin film depositions are subject to an additional fee to compensate for the high cost of the material. These prices are subject to change based on current market values.

Sputtering runs are charged the following additional fee. Pre-sputtering amounts are added to the total deposition.

- Gold: \$10.00 per every 100 Nanometers per run.
- Platinum: \$13.00 per every 100 Nanometers per run.

Precious metal evaporation sources are weighed before and after evaporation to determine the amount used. The fee per run is based on the current Engelhard Fabricated Precious Metal Price plus 25% to cover reclamation and fabrication costs.

**Monthly Expense Caps**

The Carnegie Mellon Nanofabrication Facility has an expense cap on entry and equipment fees charged to Carnegie Mellon users, as well as 501(c)(3) and U.S. Federal, State, and Local Government Organizations (there is no cap for external corporate users). Cap fees are as follows:

- The entry fee cap is \$250 a month per user per account number.
- The equipment fee cap is \$2,500 a month per user per account number.

These caps are the maximum amount that an individual user's account can be charged in a single calendar month. The cap begins on the 1<sup>st</sup> of every month and goes until the last day of that month. Multiple users using the same account number or working for the same organization (in the case of external 501(c)(3), U.S. Federal, State, and Local Government Organizations) are each subject to their own cap. One user using multiple account numbers is subject to a cap for each account number. Labor fees, material fees, and service fees are not subject to the cap.

