Carnegie Mellon University
Claire and John Bertucci
Nanotechnology Laboratory

2021-2022 Facility Rates and Expense Caps

The Claire and John Bertucci Nanotechnology Laboratory rates for the 2021-2022 fiscal year are listed in the following tables. Carnegie Mellon internal users and external U.S. Federal, state, or local government organizations are charged at the "CMU" rate. External academic and 501(c)(3) non-profit organizations are charged at the "Academic" rate. External for-profit corporate/industry users are charged at the "Corporate" rate. Each user is also charged a monthly membership fee for each month in which usage occurs. The fee can be applied as credit towards entry fees, nanofab process development/labor, or staff services. However, any unused portion of the monthly fee cannot be rolled over at the end of the month. One can sign-up to use the Nanofab or opt out (by unenrolling) at any point during the fiscal year.

NANOFAB FEES / SERVICES	CHARGE TYPE	CMU	ACADEMIC	CORPORATE
Monthly Membership Fee	Per month	$180.00	$180.00	$180.00
Entry Fee	Per Day	$20.60	$45.32	$57.68
Nanofab Process Development/Labor	Per Hour	$68.22	$150.08	$191.02
Wafer Dicing Service	Per Hour	$87.55	$192.61	$245.14

THIN-FILM DEPOSITION TOOL RATES	CHARGE TYPE	CMU	ACADEMIC	CORPORATE
Anatec Gold Coater	Per Run	$51.50	$113.30	$144.20
Angstrom Engineering Covap II Thermal Evaporator	Per Run	$77.25	$169.95	$216.30
Cambridge Nanotech Fiji ALD System	Per Run + Precursor Fees	$77.25	$169.95	$216.30
Commonwealth Scientific Ion Beam Deposition System	Per Run	$77.25	$169.95	$216.30
Nickel Electroplating System	Per Run	$51.50	$113.30	$144.20
CVC Connexion Sputtering System	Per Run	$77.25	$169.95	$216.30
GVD Corporation iLab CVD	Per Run	$77.25	$169.95	$216.30
GVD Corporation oLab CVD	Per Run	$77.25	$169.95	$216.30
Kurt J. Lesker PVD 75 Electron Beam Evaporator	Per Hour	$87.55	$192.61	$245.14
Kurt J. Lesker PVD 75 Sputtering System	Per Hour	$87.55	$192.61	$245.14
Leybold-Heraeus Z-400 Sputtering Systems #1 & #2	Per Run	$77.25	$169.95	$216.30
Nanofab Sputtering Systems #1 - #5	Per Run	$77.25	$169.95	$216.30
Perkin Elmer 2400 6J Sputtering System	Per Run	$77.25	$169.95	$216.30
Perkin Elmer 2400 8L Sputtering System	Per Run	$77.25	$169.95	$216.30
SCS Labcoter 2 Parylene Deposition System	Per Run	$51.50	$113.30	$144.20
Tegal AMS AIN Sputtering System	Per Run	$77.25	$169.95	$216.30
Trion Orion II PECVD System	Per Run	$77.25	$169.95	$216.30
Ultek E. Beam Evaporator	Per Run	$77.25	$169.95	$216.30

Phone: (412) 268-5430
Email: mmoneck@andrew.cmu.edu
Web: nanofab.ece.cmu.edu

Carnegie Mellon Univ., Dept. of ECE
5000 Forbes Avenue
Pittsburgh, PA 15213

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ETCHING, POLISHING, & DICING TOOL RATES	CHARGE TYPE	CMU	ACADEMIC	CORPORATE
IPC Barrel Etcher	Per Hour	$51.50	$113.30	$144.20
Plasma-Therm 790 RIE System	Per Hour	$66.95	$147.29	$187.46
Plasma-Therm Versaline ICP RIE	Per Hour	$87.55	$192.61	$245.14
SPTS Primaxx Uetch Vapor HF Etcher	Per Hour	$82.40	$181.28	$230.72
Surface Technology Systems Multiplex ICP RIE & Aspect Advanced Oxide Etch (AOE)	Per Hour	$77.25	$169.95	$216.30
Trion Phantom II RIE System	Per Hour	$66.95	$147.29	$187.46
Commonwealth Scientific Ion BeamEtching Systems #1 & #2	Per Run	$77.25	$169.95	$216.30
Intlvac Nanoquest II Ion Mill	Per Hour	$87.55	$192.61	$245.14
Samco UV-1 Ozone Cleaner	Per Run	$20.60	$45.32	$57.68
Strasbaugh 6EC CMP	Per Hour	$51.50	$113.30	$144.20
Tousimis Critical Point Dryer	Per Run	$51.50	$113.30	$144.20
Xactix Xetch XeF2 Etcher	Per Hour	$30.90	$67.98	$86.52

LITHOGRAPHY TOOL RATES	CHARGE TYPE	CMU	ACADEMIC	CORPORATE
ASML 5500/80 i-Line Wafer Stepper	Per Hour	$103.00	$226.60	$288.40
Elionix ELS-G100 Electron Beam Lithography System	Per Hour	$128.75	$283.25	$360.50
FEI Sirion 600 SEM With Nabity E. Beam Lithography System	Per Hour	$77.25	$169.95	$216.30
Heidelberg DWL 66FS	*Per Hour (for Litho)	$25.75	$56.65	$72.10
	*Per 4" Photo Mask	$275.00	$605.00	$770.00
	*Per 5" Photo Mask	$340.00	$748.00	$952.00
	*Per 6" Photo Mask	$500.00	$1,100.00	$1,400.00
	*Per 7" Photo Mask	$600.00	$1,320.00	$1,680.00
Hot Pack Vacuum Oven	Per Run	$25.75	$56.65	$72.10
Karl Suss MA56 Mask Aligner	Per Hour	$61.80	$135.96	$173.04
Karl Suss MA6 Mask Aligner	Per Hour	$72.10	$158.62	$201.88
Karl Suss MJB3 Mask Aligner	Per Hour	$51.50	$113.30	$144.20
YES HMDS Vapor Prime Oven	Per Run	$25.75	$56.65	$72.10

*Per mask charges are for masks produced by Nanofab staff (i.e. fee-for-service). The rate listed is a flat rate per mask, which includes labor, consumables (mask plate, resist, etchants, etc.), and machine time. They are not subject to the monthly rate cap. Masks produced by users without staff assistance will be charged at the per hour rate for lithography, and the cost of the mask plates and addtional consumables will be charged separately (they must be purchased as consumable supplies in FOM).

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FURNACE / ANNEALING TOOL RATES	CHARGE TYPE	CMU	ACADEMIC	CORPORATE
AG Associates Rapid Thermal Annealer	Per Run	$51.50	$113.30	$144.20
Annealing Furnace	Per Run (No Gas)	$25.75	$56.65	$72.10
	Per Run (With Gas)	$51.50	$113.30	$144.20
Magnetic Field Vacuum Annealer	Per Run	$51.50	$113.30	$144.20
Thermcraft 2” Barrel Furnace	Per Run (No Gas)	$51.50	$113.30	$144.20
	Per Run (With Gas)	$77.25	$169.95	$216.30

METROLOGY & INSPECTION TOOL RATES	CHARGE TYPE	CMU	ACADEMIC	CORPORATE
KLA-Tencor P-15 Profilometer	Per Hour	$51.50	$113.30	$144.20
Nanometrics Nanospec 210XP	Per Hour	$41.20	$90.64	$115.36
Olympus MX80 Microscope With Optronics Digital Camera System	Per Day	$25.75	$56.65	$72.10
Tencor Alpha-Step 200 Profilometer	Per Hour	$41.20	$90.64	$115.36
Tencor Flexus Stress Measurement System	Per Hour	$51.50	$113.30	$144.20
FEI Sirion 600 SEM W ith Nabity E. Beam Lithography System	Per Hour	$77.25	$169.95	$216.30

Hourly Rates

Labor rates and machine time for hourly equipment is all billed based on actual time used rounded to the unit of minutes, with each machine having a minimum charge per run billed at 40% of the hourly rate. For example, the charges for using a piece of equipment having an hourly rate of $50/hr would be $20 for a 10min run or $75 for a run lasting 1hr and 30min.

Monthly Expense Caps

The Bertucci Nanotechnology Laboratory 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:

Carnegie Mellon Users and U.S. Federal, State, and Local Government Users
- The entry fee cap is $260 a month per user per account number
- The equipment fee cap is $2,575 a month per user per account number

501(c)(3) Users
- The entry fee cap is $572 a month per user per account number
- The equipment fee cap is $5,665 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 1st 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, consumable purchases, staff-generated photomasks, and service fees are not subject to the cap.

***Consumables and Consumable Fees**

The Bertucci Nanotechnology Laboratory currently operates a storeroom for the purchase of consumable supplies and materials necessary to conduct micro/nanofabrication research. Charges for consumables are updated regularly to reflect changes in market pricing. Current prices can be found in our Facility Online Manager (FOM) software database at http://nanofom.ece.cmu.edu/.

Processes that require high-cost consumables are also subject to additional consumable fees as follows:

Precursor Fees

Atomic layer depositions are subject to an additional fee to compensate for the high cost of the precursors. Fees will vary by precursor and will be calculated based on precursor cost at time of purchase divided by the projected number of runs. Fees may range from $5.00 per 10nm to more than $100 per 10nm depending on the material. Specialty materals, such as Pt, are especially costly. Users should contact Nanofab staff regarding questions about precursor costs.

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 is 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.

***Please note that in accordance with recharge policies, additional surcharges amounting to 1.2X and 1.8X the cost of the consumable will be added to all consumable costs for external 501(c)(3) and Corporate users respectively.**