

MN MEDTECH PATHWAYS

Your Pathway to a Career in Biosensing

Explore. Learn. Build. Innovate. Impact Lives.

A Minnesota career-exploration guide for 9th–12th grade students

Start With What You Value

Before you pick a major or chase a job title, start somewhere more personal: your **career values**. Career success and satisfaction are closely linked to doing work that's consistent with what matters most to you. When you know your career values, it becomes much easier to:

- Assess your current situation and what's working (or isn't),
- Plan for the future with a clearer sense of direction,
- Find the right opportunities instead of chasing every option,
- Decide what direction to take your career in as it grows.

Values are the compass. A pathway built on work you find meaningful is far more likely to keep you engaged through the hard classes, the first job, and every pivot after that — which is exactly why this guide starts here, before any program or salary table.

Try the Career Values Card Sort (free, 10–15 minutes)

The **Career Values Card Sort** is a simple, free, and genuinely fun self-reflection tool you can use at any point in your career. It also makes for great conversations with friends, family, teachers, or a career coach. It was developed by Carole Brown and Louisa Scagliotti, two of Australia's most experienced career coaches.

Take the card sort here: <https://www.icscareers.com.au/card-sort/>

Step 1 — Sort each value. Drag each of the 24 career values into one of five columns based on how important it is to you. There's no limit per column, but try to place some in each — that's what helps you see what truly matters most and least. When you're unsure, go with the “best fit” column; you can rearrange as many times as you like.

Step 2 — Review and prioritise. Once sorted, order the values top-to-bottom within each column so your highest priorities rise to the top.

Step 3 — View and print your results. Click next to see your results, plus reflection questions that help you make further sense of your values. Use the back button anytime to adjust.

Once you've named your values, keep them in mind as you read on. If “making a tangible impact on health” or “working at the frontier of technology” rose to your top column, biosensing may be a strong match — so let's look at what it is.

So You're Curious About Biosensing

So you completed the Career Values Card Sort and discovered you're interested in medical technology — especially **biosensing**: the science of detecting what's happening inside the body and turning it into a signal we can read. From the glucose sensor on someone's arm to the lab test that catches a disease early, biosensors are everywhere in modern medicine, and this field is growing fast.

What exactly is a biosensor?

A biosensor brings together three pieces:

- **A biological recognition element** — cells, enzymes, antibodies, DNA, or proteins — that “notifies” the thing you want to measure.
- **A transducer** — electrical, optical, mechanical, or chemical — that turns that biological event into a measurable signal.
- **Signal processing and data analysis** that make the signal readable and useful.

You already meet biosensors all the time: continuous glucose monitors, COVID-19 rapid tests, wearable health monitors, cancer biomarker detection systems, environmental pathogen sensors, and implantable medical devices.

The infographic on the next page breaks down how every biosensor works — and shows how many you've probably already used.

WHAT IS BIOSENSING?

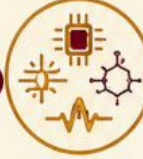
Biosensing is the science of detecting biological, chemical, or environmental information and turning it into **signals** that people can understand and use.




EVERY BIOSENSOR COMBINES:



BIOLOGICAL RECOGNITION
cells, DNA, proteins, enzymes
It "notices" the target.



SENSOR TECHNOLOGY
electrical, optical, mechanical, chemical
It turns the event into a measurable signal.



DATA ANALYSIS AND AI
It makes the signal readable and useful.

YOU'VE ALREADY USED BIOSENSING!



CONTINUOUS GLUCOSE MONITORS



SMART WATCHES AND FITNESS TRACKERS



RAPID COVID TESTS



HEART-RATE MONITORS



SMART HEARING AIDS



WATER-QUALITY MONITORING SYSTEMS



AIR-QUALITY SENSORS



FOOD SAFETY TESTING



ENVIRONMENTAL PATHOGEN DETECTION

WHY BIOSENSING MATTERS



Detect disease earlier



Protect our environment



Monitor clean water



Improve air quality



Improve food safety



Support aerospace and defense systems



Power AI-driven healthcare



Enable next-generation semiconductor technologies

STUDENTS ENTERING HIGH SCHOOL TODAY
MAY WORK IN CAREERS THAT DO NOT YET EXIST.

Your curiosity. Your ideas. Our future.

DISCOVER. EXPLORE. INNOVATE. MAKE AN IMPACT.




Every biosensor combines biological recognition, sensor technology, and data analysis.

There's No Single “Right” Major

Biosensing is wonderfully interdisciplinary, so several majors lead into it. Here's how the main ones connect:

Biomedical Engineering — the most direct route. Combines physiology, medical devices, signal processing, sensors, materials, and regulatory know-how.

Leads to: Biosensor Engineer, Medical Device Engineer, R&D Scientist

Electrical Engineering — circuits, embedded systems, microelectronics, and wireless. Many cutting-edge biosensors are tiny electrical systems that happen to measure biology.

Leads to: Sensor Hardware Engineer, Wearable Device Engineer

Chemical Engineering — bioprocessing, microfluidics, and surface chemistry. A strong path for diagnostic and “lab-on-a-chip” biosensors.

Leads to: Diagnostics Engineer, Process Development Engineer

Materials Science & Engineering — nanotechnology, biomaterials, and conductive polymers. Next-generation biosensors rely on materials like graphene and engineered nanoparticles.

Leads to: Biomaterials Scientist, Sensor Materials Researcher

Biochemistry / Molecular Biology — proteins, antibodies, and DNA technologies. Best if you want to build the biological part of the sensor.

Leads to: Assay Development Scientist, Molecular Diagnostics Scientist

Computer Science + Data Science — machine learning, signal processing, and health informatics. Exploding right now because biosensors generate huge streams of data.

Leads to: Digital Health Scientist, Bioinformatics Engineer

Three Example Game Plans

If you're not sure where to start, here are three routes students commonly take:

- **Industry-focused:** B.S. in Biomedical Engineering → internship with a medical device company → M.S. in Biomedical Engineering.
- **Inventor / researcher:** B.S. in Electrical Engineering or Materials Science → undergraduate research in biosensors → Ph.D. in Bioengineering.
- **Entrepreneur:** B.S. in Biomedical or Chemical Engineering → research experience → startup incubator → (optional) MBA later.

A smart, low-cost Minnesota pipeline: start with a Biotechnology or science transfer A.S. at a community college, transfer to UMN Twin Cities, get undergraduate research experience in biosensors or diagnostics, and intern with a company like Medtronic, Abbott, or Boston Scientific. Graduate school (a master's or Ph.D.) is optional but valuable if you want to become a true biosensing expert rather than simply work in the field.

How Education Connects to Careers and Pay

Roughly speaking, the further you go in school, the more specialized (and higher-paying) the roles become. These are approximate U.S. ranges, not Minnesota guarantees. The figures below are anchored to national median wages for representative occupations:

Education	Example Jobs	Typical Salary Range
Associate Degree	Biological Technician, Biomedical Equipment Tech (BMET)	\$50K – \$75K
Bachelor's Degree	Biomedical Engineer, R&D Associate	\$75K – \$120K
Master's Degree	Senior Biosensor Engineer, Product Development Engineer	\$110K – \$150K+
PhD	Principal Scientist, Research Director	\$130K – \$250K+

*Source: U.S. Bureau of Labor Statistics, Occupational Outlook Handbook (OOH), May 2024 median wages — biological technicians \$52,000; medical equipment repairers \$62,630; bioengineers & biomedical engineers \$106,950; data scientists \$112,590. Occupation detail cross-referenced with O*NET OnLine. Wages vary by experience, employer, and location. See Sources at the end of this guide.*

The poster on the next page shows future biosensing technologies you could help invent — and the careers (with real salary ranges) that make an impact today.



THE FUTURE IS IN YOUR HANDS

WHAT WILL YOU INVENT?



FUTURE BIOSENSING TECHNOLOGIES

From labs today to breakthroughs tomorrow—these innovations could change the world and create careers that don't even exist yet!

1



SMART CONTACT LENSES

2



ELECTRONIC SKIN SENSORS

3



WEARABLE DISEASE DETECTORS

4



AI-POWERED DIAGNOSTICS

5



QUANTUM SENSING SYSTEMS

6



BRAIN-COMPUTER INTERFACES

7



ENVIRONMENTAL BIOSENSORS

8



SMART AGRICULTURE SENSORS

9



WATER-QUALITY MONITORING NETWORKS

10



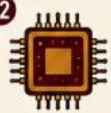
AIR-QUALITY MONITORING SYSTEMS

11



SPACE & AEROSPACE HEALTH SENSORS

12



SEMICONDUCTOR-ENABLED BIOSENSING CHIPS


Tomorrow's breakthroughs start with today's curiosity.
 Your ideas can improve health, protect our planet, and transform lives.
 

BIOSENSING CAREERS THAT MAKE AN IMPACT

	CAREER	WHAT THEY DO	TYPICAL SALARY*
	BIOSENSOR ENGINEER	Builds medical devices and sensors	\$75K – \$130K
	BIOMEDICAL ENGINEER	Designs healthcare technologies	\$75K – \$120K
	ENVIRONMENTAL SCIENTIST	Uses sensors to protect ecosystems	\$60K – \$110K
	DATA SCIENTIST	Analyzes biosensor data using AI	\$80K – \$150K
	SEMICONDUCTOR ENGINEER	Creates sensor chips	\$85K – \$160K
	BIOINFORMATICS SCIENTIST	Uses computing to understand biology	\$90K – \$160K
	WATER QUALITY SPECIALIST	Monitors drinking water systems	\$60K – \$120K
	AIR QUALITY SCIENTIST	Tracks pollutants and health risks	\$60K – \$120K
	RESEARCH SCIENTIST	Invents next-generation technologies	\$90K – \$250K+


***SALARY INFORMATION SOURCE:**
 U.S. Bureau of Labor Statistics (BLS)
 Occupational Outlook Handbook
 (updated May 2024)
www.bls.gov/ooh


The future needs innovators like you.
 Explore. Learn. Invent. Make an impact.
YOU can shape tomorrow.



Scan to explore careers and opportunities!

Future biosensing technologies and the careers they create. Salary source: U.S. Bureau of Labor Statistics (BLS) Occupational Outlook Handbook, May 2024; occupations cross-referenced with O*NET OnLine.

Your Minnesota Pathway Map

Below is Minnesota's pathway map into the biosensing side of MedTech. Start with an affordable two-year Associate of Science (A.S.) or technical program, save thousands in tuition, then transfer to a four-year university — or step straight into a career. The map on the next page lays out your two-year starting points: community and technical colleges, what they cost, their featured programs, and how their credits transfer onward.

Why transfer? Save thousands on tuition, enjoy small class sizes and personal support, move seamlessly into top universities, and land high-demand careers in Minnesota's bioscience and MedTech industries.

YOUR PATHWAY TO A CAREER IN BIOSENSING

Start Here. Transfer. Succeed.

2-YEAR PATHWAYS – START HERE, BUILD YOUR FOUNDATION

COLLEGE	LOCATION	WEBSITE	ESTIMATED COST	FEATURED PROGRAMS	TRANSFER INFORMATION
ANOKA-RAMSEY COMMUNITY COLLEGE	Coon Rapids, MN	anokatech.edu/programs/career-pathways/	Estimated Cost • \$208.16 per credit (including fees) • \$6,245 per year (FY2027)	FEATURED PROGRAMS (A.A.S. unless noted) - Biomedical Equipment Technician - Robotic & Electronic Engineering Technology - Electronic Technology (Diploma) - Quality Technician	TRANSFER INFORMATION Credits transfer to the University of Minnesota, Minnesota State University campuses, and other colleges and universities. Articulation agreements available for engineering and science majors.
RIVERLAND COMMUNITY COLLEGE	Austin, MN	riverland.edu/academics/programs/biotechnology/	Estimated Cost • \$7,132 per year (tuition and fees for full-time students)	FEATURED PROGRAM Biotechnology (A.S.) Program Focus: Biology, microbiology, chemistry, biotechnology, lab techniques, research, quality assurance, and data analysis.	TRANSFER INFORMATION Part of the Minnesota State system. Credits transfer to Minnesota State universities with junior status guaranteed through the Minnesota State Transfer Pathway. Also transfers to the University of Minnesota and other universities.
MINNEAPOLIS COLLEGE	Minneapolis, MN	minneapolis.edu/academics/programs	Estimated Cost • \$6,396 per year (15 credits/semester)	TOP PATHWAYS FOR TRANSFER - Biology - Chemistry - Physics - Engineering - Computer Science - Mathematics	TRANSFER INFORMATION Courses transfer to the University of Minnesota, Minnesota State University campuses, and many other colleges and universities.
SAINT PAUL COLLEGE	Saint Paul, MN	saintpaul.edu/academics	Estimated Cost • \$5,600 per year (Minnesota resident)	TOP PATHWAYS FOR TRANSFER - Chemistry - Biology - Physics - Engineering - Mathematics - Computer Science	TRANSFER INFORMATION Articulated transfer pathways to the University of Minnesota, Minnesota State universities, and other accredited colleges and universities.
M STATE MINNESOTA STATE (ALL CAMPUSES)		minnesota.edu/academics	Estimated Cost Varies by campus (= two years of Minnesota community college tuition)	ENGINEERING TRANSFER A.S. - Degree: Associate of Science (A.S.) - Length: 2 years - Program Focus: Engineering fundamentals, calculus, physics, electronics, CAD, engineering design, programming, and problem solving. - Degree/Certificate: Engineering Fundamentals Certificate	TRANSFER INFORMATION Articulated transfer to the University of Minnesota College of Science & Engineering (CSE), Minnesota State University campuses, and other engineering programs.

WHY START AT A 2-YEAR COLLEGE?

- ✓ Save thousands on tuition
- ✓ Small class sizes & personal support
- ✓ Seamless transfer to top universities
- ✓ High-demand careers in Minnesota's bioscience & MedTech industries

OTHER 2-YEAR SCIENCE & ENGINEERING TRANSFER OPTIONS

NORMANDALE COMMUNITY COLLEGE Bloomington, MN normandale.edu STRONG TRANSFER PROGRAMS - Biology - Chemistry - Physics - Engineering Fundamentals - Computer Science - Mathematics TRANSFER INFORMATION Excellent preparation for transfer into Biomedical Engineering, Biochemistry, Biology, Computer Science, and Chemical Engineering. Credits transfer to the University of Minnesota and Minnesota State universities.	NORTH HENNEPIN COMMUNITY COLLEGE Brooklyn Park, MN nhcc.edu RECOMMENDED PATHWAYS - Biology - Chemistry - Physics - Computer Science - Engineering - Mathematics TRANSFER INFORMATION Students commonly transfer into the University of Minnesota and Minnesota State STEM programs.	CENTURY COLLEGE White Bear Lake, MN century.edu STRONG TRANSFER PATHWAYS - Biology (Transfer Pathway) - Chemistry - Engineering - Computer Science - Health Sciences - Biotechnology-related laboratory coursework TRANSFER INFORMATION Courses transfer to the University of Minnesota, Minnesota State universities, and other institutions.	INVER HILLS COMMUNITY COLLEGE Inver Grove Heights, MN inverhills.edu RECOMMENDED PATHWAYS - Biology - Chemistry - Physics - Engineering - Mathematics - Computer Science TRANSFER INFORMATION Students are well prepared for transfer into biomedical engineering, biotechnology, and life science programs.
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TECHNICAL EDUCATION PATHWAYS – ENTER THE WORKFORCE SOONER

ANOKA TECHNICAL COLLEGE Coon Rapids, MN anokatech.edu/programs/career-pathways/ PROGRAMS INCLUDE - Biomedical Equipment Technician - Robotic & Electronic Engineering Technology - Electronic Technology - Quality Technician	DAKOTA COUNTY TECHNICAL COLLEGE Rosemount, MN dctc.edu RECOMMENDED PROGRAMS - Mechatronics - Electronics Technology - Engineering Technology - Manufacturing Technology - Quality and Automation - Precision Manufacturing
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TRANSFER TIP: Work with an advisor at your community college to choose courses that fit your transfer goals and ensure your credits transfer smoothly to your next institution.

Start here. Go far.
The future is yours!

Minnesota's two-year starting points into biosensing — community and technical colleges, their costs, featured programs, and transfer routes.

Two-Year Starting Points

These community and technical colleges offer affordable, hands-on pathways into biosensing. Tuition figures are approximate and subject to change — always confirm current rates with each institution.

Anoka Technical College — Coon Rapids, MN

Explore: anokatech.edu/programs/career-pathways

Featured programs: Biomedical Equipment Technician (A.A.S.), Robotic & Electronic Engineering Technology (A.A.S.), Electronic Technology (Diploma), Quality Technician (A.A.S.). Estimated tuition ~\$5,225 per semester.

Typical careers: Biomedical Equipment Technician, Robotics Technician, Sensor Systems Technician, Quality Technician

Source: Tuition: Anoka Technical College, tuition & fees page (verify current rate).

Riverland Community College — Austin, MN

Explore: riverland.edu/academics/programs/biotechnology-as

Biotechnology Associate of Science (A.S.) — the most direct two-year pathway into biosensing. 2 years / 60 credits, ~\$13,844 total. Biology, microbiology, chemistry, lab techniques, quality assurance, and data analysis.

Typical careers: Laboratory Technician, Research Assistant, Assay Development Technician, Biomanufacturing Associate, QC Analyst

Source: Tuition: Riverland Community College Biotechnology program page (tuition & fees subject to change).

Minneapolis College — Minneapolis, MN

Explore: minneapolis.edu/academics/school-science-and-mathematics

A.S. transfer pathways in Biology, Chemistry, Computer Science, Physics, and Mathematics. Estimated cost ~\$6,396 per year (15 credits/semester). Transfers to UMN, Minnesota State universities, and beyond.

Typical careers: Bioinformatics Analyst, Sensor Chemist, Clinical Lab Technician, Data Scientist, Instrumentation Specialist

Source: Tuition: Minneapolis College tuition & fees page (approximate; confirm current per-credit rate).

Saint Paul College — Saint Paul, MN

Explore: saintpaul.edu/academics

Chemistry and Biology Transfer Pathways (A.S.), each ~\$5,600 per year (Minnesota resident), with a Research Certificate and hands-on lab instrumentation. Guaranteed junior status at Minnesota State universities.

Typical careers: Laboratory Chemist, Bioassay Technician, Sensor Materials Technician, QC Analyst, Diagnostics Lab Technician

Source: Tuition: Saint Paul College tuition & fees page (approximate; confirm current rate).

M State (Minnesota State Community & Technical College) — All campuses

Explore: minnesota.edu/academics

Engineering Transfer Pathway (A.S.), 2 years. Cost varies by campus (approximately two years of Minnesota community college tuition). Engineering fundamentals, calculus, physics, electronics, CAD. Articulated transfer to UMN CSE.

Typical careers: Electronics Technician, Instrumentation Technician, R&D Assistant, Sensor Systems Technician

Source: Tuition: M State tuition & fees page (varies by campus; confirm current rate).

Other Minnesota Transfer Options

Several additional community colleges offer strong A.S. transfer programs in Biology, Chemistry, Physics, Engineering, Computer Science, and Mathematics: **Normandale, North Hennepin, Century, and Inver Hills**. For students who want to enter the workforce sooner, **Anoka Technical College** and **Dakota County Technical College** offer hands-on technical programs in mechatronics, electronics, engineering technology, and precision manufacturing.

4-YEAR PATHWAYS INTO BIOSENSING CAREERS

Advance Your Education. Specialize. Innovate. Impact Lives.

1 UNIVERSITY OF MINNESOTA TWIN CITIES

cse.umn.edu

\$ Estimated MN resident cost for CSE majors: ≈ \$20,500–\$21,000/year.
Includes base tuition/fees plus CSE surcharge.

1 BIOMEDICAL ENGINEERING

B.Bm.E.,
ABET-accredited,
4 years

FOCUS: biosensors, biomedical instrumentation, device design, physiology, microsystems.

CAREERS:

- Biosensor Engineer
- Medical Device Designer
- Physiological Monitoring Engineer

2 CHEMISTRY / BIOCHEMISTRY

B.S.,
4 years

FOCUS: electrochemistry, spectroscopy, biomolecules, analytical lab research.

CAREERS:

- Sensor Chemist
- Assay Developer
- Electrochemical R&D Scientist

3 ELECTRICAL ENGINEERING

B.E.E.,
ABET-accredited,
4 years

FOCUS: microelectronics, signal processing, embedded systems, sensors, Minnesota Nano Center access.

CAREERS:

- Sensor Electronics Engineer
- Signal Processing Engineer
- Microfabrication Engineer

4 BIOSYSTEMS & BIOENGINEERING

B.M.E., with
bioengineering focus,
4 years

FOCUS: wearable technology, bioengineering, medical devices, biorobotics.

CAREERS:

- Wearable Biosensor Engineer
- BioMEMS Engineer
- Medical Device R&D Engineer

5 CHEMICAL ENGINEERING & MATERIALS SCIENCE

B.Chem.E. or
B.Mat.Sci.,
ABET-accredited,
4 years

FOCUS: microfluidics, biomaterials, nanomaterials, surface chemistry.

CAREERS:

- Lab-on-a-Chip Engineer
- Diagnostics Engineer
- Sensor Materials Researcher

6 COMPUTER SCIENCE / DATA SCIENCE

B.S., or B.A.,
4 years

FOCUS: AI, machine learning, health informatics, biosensor data analytics.

CAREERS:

- Sensor Analytics Scientist
- Bioinformatics Engineer
- Digital Health / ML Engineer

★ UMN OPPORTUNITIES

• Medical Devices Center • Institute for Engineering in Medicine • UROP Research
• Minnesota Nano Center • Industry Senior Design • Internships & Co-ops

2 MINNESOTA STATE UNIVERSITY, MANKATO

cset.mnsu.edu

\$ Estimated MN resident cost: ≈ \$9,655/year.
Specialized engineering delivery tracks may cost more.

1 INTEGRATED ENGINEERING

B.S.E., 4 years

FOCUS: engineering design, manufacturing systems, automation, robotics, quality systems, Lean Manufacturing, Six Sigma.

CERTIFICATES: Six Sigma + Lean Manufacturing

CAREERS:

- Sensor Systems Engineer
- Process Engineer
- Medical Device Manufacturing Engineer
- Automation Engineer

2 BIOCHEMISTRY / BIOMEDICAL SCIENCES

B.S., 4 years

FOCUS: biochemistry, molecular biology, microbiology, physiology, analytical chemistry, undergraduate research.

CAREERS:

- Clinical Lab Scientist
- Bioassay Developer
- Diagnostics R&D Assistant
- Biotechnology Lab Specialist

TRANSFER PATH: 2-YEAR COLLEGE → BACHELOR'S DEGREE → INTERNSHIP / RESEARCH → BIOSENSING CAREER

MEDICAL DEVICES

DIAGNOSTICS

DIGITAL HEALTH

SEMICONDUCTORS

ENVIRONMENTAL SENSORS

Four-year pathways into biosensing careers at the University of Minnesota Twin Cities and Minnesota State University, Mankato. Cost figures: institutional tuition pages; careers and wages: BLS OOH (May 2024) and O*NET OnLine.

Four-Year University Programs

University of Minnesota Twin Cities

Explore: cse.umn.edu/college/hello-future-undergrad

Internationally recognized for biomedical engineering, medical devices, and biosensing. Estimated cost for Minnesota residents is approximately **\$17,500–\$21,000 per year** (tuition and required fees, including the College of Science & Engineering surcharge of \$1,494 per semester / ~\$2,988 per year). Students tap the Medical Devices Center, Institute for Engineering in Medicine, the Minnesota Nano Center, and the Undergraduate Research Opportunities Program (UROP).

Source: University of Minnesota Office of Admissions, Cost of Attendance (2026–27 estimate), and One Stop Student Services tuition pages. Tuition and fees are set by the Board of Regents each July.

Biomedical Engineering (B.Bm.E. — ABET)

Biosensors, physiology, biomedical microsystems, biomaterials, device design, signal processing.

Careers: Biosensor Engineer, Medical Device Design Engineer, Physiological Monitoring Engineer

Chemistry & Biochemistry (B.S.)

Analytical chemistry, electrochemistry, spectroscopy, protein chemistry, biomolecular sensing.

Careers: Sensor Chemist, Assay Development Scientist, Molecular Diagnostics Scientist

Electrical Engineering (B.E.E. — ABET)

Electronics, embedded systems, microelectronics, signal processing, Minnesota Nano Center access.

Careers: Sensor Electronics Engineer, Embedded Systems Engineer, Microfabrication Engineer

Biosystems & Bioengineering (B.M.E.)

Biomechanics, wearable technology, microfluidics, Biosensing & Biorobotics Laboratory.

Careers: Wearable Biosensor Engineer, BioMEMS Engineer, Medical Device R&D Engineer

Chemical Engineering & Materials Science (ABET)

Nanotechnology, biomaterials, microfluidics, surface chemistry, Lab-on-a-Chip technology.

Careers: Lab-on-a-Chip Engineer, Diagnostics Engineer, Sensor Materials Researcher

Computer Science & Data Science (B.S./B.A.)

AI, machine learning, bioinformatics, health informatics, biomedical data analytics.

Careers: Sensor Analytics Scientist, Bioinformatics Engineer, Digital Health Scientist, ML Engineer

Minnesota State University, Mankato

Explore: cset.mnsu.edu

Outstanding engineering and life-science programs with strong Minnesota employer relationships. Estimated cost for Minnesota residents is approximately **\$9,655 per year** (tuition and fees; specialized engineering delivery tracks may cost more). Mankato welcomes A.S. transfer students from community and technical colleges statewide.

Source: Minnesota State University, Mankato tuition & fees pages (College of Science, Engineering & Technology). Confirm current rates directly with the university.

Integrated Engineering (B.S.E.)

Engineering design, manufacturing systems, automation, robotics, Six Sigma and Lean Manufacturing certificates.

Careers: Sensor Systems Engineer, Process Engineer, Automation Engineer, Product Development Engineer

Biochemistry & Biomedical Sciences (B.S.)

Biochemistry, molecular biology, physiology, analytical chemistry, Pre-Med / Pre-Health tracks, faculty-mentored research.

Careers: Clinical Lab Scientist, Bioassay Development Scientist, Diagnostics R&D Associate

Minnesota Industry & High School Opportunities

Minnesota is home to one of the nation's largest medical device ecosystems. Many local employers run programs built specifically for high school students — paid internships, mentorship, lab tours, and scholarships. A few highlights:

Abbott — Blueprint Program

Abbott's FreeStyle Libre is a coin-sized biosensor that reads glucose in interstitial fluid and sends a reading to a phone every minute. The Blueprint Program is a **paid** summer STEM internship that launches high-school students into medical technology through hands-on projects and industry mentorship.

Medtronic — Medtronic Spark

Medtronic builds continuous glucose monitors and sensing systems that feed real-time body data into therapies like insulin delivery. Spark is a 10-year commitment to propel 1 million students from low-income households into health-tech careers via Innovator Labs, Credentials, and Scholarships.

Solventum (formerly 3M Health Care)

Solventum develops diagnostics, monitoring, and materials science that underpin many biosensing applications, and supports education and training through fellowships for study and research.

Starkey — Starkey Cares

Starkey's Eden Prairie hearing devices now double as ear-worn biosensors — tracking heart rate, activity, and fall detection alongside sound.

More partners featured on the following pages include Thermo Fisher Scientific, Mayo Clinic, Seagate, 3M, Honeywell, Collins Aerospace, Ecolab, Kurita America, and Cargill — plus the CHIPS for America workforce programs, IEEE TryEngineering, and Minnesota State Fair STEM Day.

✓ **Before you apply: verify current program details (checked June 2026)**

Company programs change year to year, and a few on the following posters have important details worth confirming before you get your hopes set on them:

Abbott Blueprint and **Medtronic Spark** are active and open to high schoolers (Medtronic Spark's scholarship supports graduating seniors heading into 2–4 year programs; its Innovator Labs reach high schoolers directly).

Thermo Fisher's flagship student competition (the Junior Innovators Challenge) is aimed at **middle school** students, not high schoolers — its high-school involvement is broader STEM outreach and lab tours.

Mayo Clinic's SPARK research program runs only at its **Florida** campus. For Minnesota students, look instead at Mayo's **Rochester, MN** High School Volunteers program (age 14+) and High School Internship program (grades 11–12).

EPA air- and water-quality opportunities are mostly aimed at **college and graduate** students; high schoolers can enter chiefly through the federal Pathways Program.

Bottom line: treat the posters as a starting map, and always confirm eligibility, dates, and deadlines on each program's official website before applying.

MINNESOTA INDUSTRY HIGH SCHOOL OPPORTUNITIES

EXPLORE • RESEARCH • INNOVATE • BUILD YOUR FUTURE

Hands-on experience. Top mentors. Real-world impact. Endless possibilities.

MEDICAL TECHNOLOGY & HEALTHCARE

Blueprint Program

Paid summer STEM internship for high school students. Work on real projects, gain industry mentorship, and explore careers in medical technology and diagnostics.

Cost: Paid
Grades: High school
Learn more: abbott.com/careers

Medtronic Spark

Global initiative preparing 1 million students from underserved communities for careers in healthcare technology through Innovator Labs, Credentials, and Scholarships.

Cost: Free
Grades: High school
Learn more: medtronic.com/spark

STEM & Career Exploration

Explore careers in medical materials, diagnostics, and healthcare solutions through STEM outreach, job shadowing, and internship opportunities.

Cost: Free
Grades: High school
Learn more: solventum.com/en-us/home/our-company/careers/

Student Opportunities

STEM outreach, lab tours, internships, and educational programs in biotechnology, diagnostics, and laboratory instrumentation.

Cost: Free
Grades: High school
Learn more: jobs.thermofisher.com

SPARK & Career Exploration

Research mentoring, summer learning, and career exploration programs in medicine, precision health, AI, and medical innovation.

Cost: Free
Grades: High school
Learn more: jobs.mayoclinic.org/students

SEMICONDUCTOR & ADVANCED MANUFACTURING

Future Ready & STEM Programs

STEM outreach, mentoring, manufacturing career exploration, and future internship opportunities.

Cost: Free
Grades: High school
Learn more: seagate.com/jobs

3M Visiting Wizards & STEM Programs

STEM demonstrations, science fairs, mentorship, scholarships, and engineering outreach in materials science, medical tech, and manufacturing.

Cost: Free
Grades: High school
Learn more: 3m.com/3M/en_US/careers-us/

Workforce Development Programs

Explore programs funded by the CHIPS Act preparing students for careers in semiconductors, microelectronics, and sensor technologies.

Cost: Free
Grades: High school
Learn more: chips.gov

Forge the Future

STEM education, robotics, mentorship, and engineering outreach in sensors, aerospace, automation, and advanced manufacturing.

Cost: Free
Grades: High school
Learn more: careers.honeywell.com

Inspire Program

Engineering outreach, FIRST Robotics support, scholarships, and internships in aerospace sensing and embedded systems.

Cost: Free
Grades: High school
Learn more: careers.rtx.com/global/en/collins

ENVIRONMENTAL & SUSTAINABILITY CAREERS

STEM Education & Sustainability

Outreach, sustainability education, and internships in water quality, food safety, and environmental technologies.

Cost: Free
Grades: High school
Learn more: jobs.ecolab.com

Water Innovation Careers

Internships and engineering opportunities in water treatment, chemistry, and environmental technologies.

Cost: Free
Grades: High school
Learn more: kuritaamerica.com/connect/careers

Cultivating Futures

STEM outreach, internships, and innovation in food safety, agriculture, sustainability, and biosensing.

Cost: Free
Grades: High school
Learn more: careers.cargill.com/students-and-graduates

EPA Student Opportunities

Careers in air quality monitoring, environmental engineering, chemistry, and public health.

Cost: Free
Grades: High school
Learn more: epa.gov/careers

EPA Student Opportunities

Opportunities in water quality monitoring, pathogen detection, and environmental protection.

Cost: Free
Grades: High school
Learn more: epa.gov/careers

★ ADDITIONAL STEM OPPORTUNITIES FOR ALL STUDENTS

Explore Engineering. Build Your Future.

Free resources, hands-on activities, competitions, mentorship, and scholarships. Explore careers in biomedical, electrical, computer, environmental, and more.

Free engineering resources
Design challenges & activities
Career explorer & mentors
Scholarships & competitions

Learn more: tryengineering.org | students.ieee.org | ieee.org

Minnesota State Fair STEM Day

Meet Scientists. Build. Discover. Explore. Hands-on activities, industry exhibits, college info, and career exploration with top Minnesota organizations.

Meet engineers & scientists
Hands-on STEM activities
College & career information
Industry demonstrations
Family friendly & fun!

mnstatefair.org | mnstatefair.org/education

YOUR FUTURE STARTS NOW.

Explore. Experiment. Innovate. Make a real-world impact.

Scan to discover more opportunities & resources!

GET INVOLVED. BUILD SKILLS. FIND YOUR PASSION. CREATE SOLUTIONS THAT IMPROVE LIVES.

Visit these websites to learn more about opportunities and how to apply!

Minnesota industry high school opportunities across medical technology, semiconductors, and environmental careers.

MINNESOTA INDUSTRY OPPORTUNITIES

BIOSENSING INNOVATION. REAL-WORLD IMPACT.

MEDICAL TECHNOLOGY & HEALTHCARE

- Continuous glucose monitoring - Blueprint internship program abbott.com/careers	- Wearable sensors - Spark Program medtronic.com/careers	- Diagnostics - Medical materials solventum.com/en-us/home/our-company/careers/	- Diagnostics - Laboratory instrumentation - Biotechnology thermofisher.com/careers	- Precision medicine - Diagnostics research jobs.mayoclinic.org
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SEMICONDUCTOR & ADVANCED MANUFACTURING

(MedTech 3.0) - Sensor electronics - Advanced manufacturing seagate.com/jobs	- Nanotechnology - Biosensor fabrication - Semiconductor research 3m.com/3M/en_US/careers-us/	- Semiconductor workforce development - Microelectronics - Sensor manufacturing chips.gov	- Advanced sensors - Aerospace systems honeywell.com/careers	An RTX Business - Aerospace sensing technologies - Embedded systems collinsaerospace.com/careers
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ENVIRONMENTAL & SUSTAINABILITY CAREERS

- Water quality technologies - Environmental monitoring ecolab.com/careers	- Water treatment systems - Industrial monitoring kuritaamerica.com/connect/careers	- Food safety sensors - Agricultural technology cargill.com/careers	- Pollution monitoring - Industrial safety systems - Smart city sensors epa.gov/careers	- Drinking water safety - Pathogen detection - Environmental protection epa.gov/careers
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REAL COMPANIES. REAL TECHNOLOGIES. REAL CAREERS.
Explore the industries shaping Minnesota's future!

z.umn.edu/biosensing-careers

EXPLORE YOUR FUTURE
Find internships, co-ops, jobs, and career pathways across Minnesota's innovative industries.

<https://mn.gov/deed/data/data-tools/oid/>

SCAN TO LEARN MORE ABOUT THESE INDUSTRIES AND CAREER OPPORTUNITIES!

careeronestop.org

Salary ranges are national estimates and vary by experience, location, and employer. Source: U.S. Bureau of Labor Statistics (BLS) Occupational Outlook Handbook, May 2024.

Real companies, real technologies, real careers shaping Minnesota's biosensing future.

National STEM Opportunities

Beyond Minnesota, selective national programs offer high school students hands-on research tied directly to how biosensors are designed and validated — from Stanford SIMR and the NIH Summer Internship to RSI, MITES, and Project SEED. The poster below has the full details: dates, deadlines, eligibility, and links. Program details change every year, so always confirm on each program's official website.

NATIONAL STEM HIGH SCHOOL OPPORTUNITIES
Explore · Research · Innovate · Build Your Future

★ Hands-on research. Top mentors. Real-world experience. Endless possibilities.

- Stanford Institutes of Medicine Summer Research Program (SIMR)**

 Cost: Free. Stipend: \$500 (min.); \$1,500+ for students from underrepresented groups.
 Dates: June 10 – August 1 (8 weeks)
 Deadline: February (typically)
 Areas: Medicine, Bioengineering, Bioinformatics
 Eligibility: HS Juniors & seniors (16+); U.S. citizens or permanent residents
 Highlights: Hands-on research, mentorship, safety training, final poster session
med.stanford.edu/simr
- Summer Intern Program at the National Institutes of Health (NIH)**

 Cost: Free
 Dates: June to August (exact dates TBA)
 Deadline: January (typically)
 Areas: Biomedical Research, Health Sciences
 Eligibility: High school students interested in health-related fields
 Highlights: Hands-on research, mentorship from leading scientists, career exposure
nih.gov/about-nih/who-we-are/ah-summer-program/top
- Research Science Institute (RSI)**

 Cost: Free
 Dates: June 22 – August 2 (6 weeks)
 Deadline: February (typically)
 Areas: Various STEM disciplines
 Eligibility: Students entering grades 11 or 12
 Highlights: Original research, mentorship, advanced techniques, final symposium
cei.org/programs/rsi
- Project SEED (ACS)**

 Cost: Free
 Dates: June to August (exact dates TBA)
 Deadline: January (typically)
 Areas: Chemistry, Biochemistry, Environmental Science
 Eligibility: High school students from underrepresented backgrounds
 Highlights: Research mentorship, lab experience, chemistry career exposure
cei.org/education/students/project-seed.html
- NYU's Applied Research Innovations in Science & Engineering (ARISE)**

 Cost: Free. Stipend: \$750+
 Dates: June 3 – August 9 (10 weeks)
 Deadline: March (typically)
 Areas: STEM (bio & molecular engineering, chemical, CS, AI/ML)
 Eligibility: NYC students completing 10th or 11th grade
 Highlights: Lab research, mentorship, college advising, ethics training, colloquium
engineering.nyu.edu/academics/programs/arise
- Horizon Academic Research Program – STEM Tracks**

 Cost: Financial aid available
 Dates: Summer (June 24 – Sept 2) & Fall (Oct 23 – Feb. 19)
 Deadline: May 21 (summer); Sept 25 (fall)
 Areas: Data Science, Biology, Chemistry, Neuroscience
 Eligibility: High school students with GPA above 3.67
 Highlights: Personalized mentorship, publication opportunities, detailed feedback
horizonrp.com
- Lumiere Research Scholar Program**

 Cost: Financial aid available
 Dates: Year-round (12-week cohorts)
 Deadline: Varies by cohort
 Areas: Engineering, Chemistry, Data Science, CS
 Eligibility: High school students with strong academic backgrounds
 Highlights: 1-on-1 mentorship, independent research paper, advanced skill development
lumiere-research.com
- MIT Introduction to Technology, Engineering, and Science (MITES)**

 Cost: Free. Housing & meals provided.
 Dates: June – August (6 weeks)
 Deadline: February (typically)
 Areas: STEM
 Eligibility: U.S. high school juniors
 Highlights: Intensive STEM curriculum, MIT lab access, written evaluation
mites.mit.edu
- Anson L. Clark Scholars Program (Texas Tech University)**

 Cost: Free. \$750 stipend, plus free housing & meals
 Dates: June 16 – August 1 (7 weeks)
 Deadline: February (typically)
 Areas: Engineering, Biology, Chemistry, Computer Science
 Eligibility: At least 17 years old; U.S. citizens or permanent residents
 Highlights: Hands-on research, faculty mentorship, seminars, field visits
ansonclark.org
- National Youth Science Camp (NYSC)**

 Cost: Free
 Dates: June 17 – July 11
 Deadline: February 15
 Areas: Physics, Biology, Chemistry
 Eligibility: High school seniors
 Highlights: Research experience, scientist mentorship, collaborative learning
nyscamp.org
- MIT OpenCourseWare (OCW)**

 Cost: Free
 Dates: Self-paced
 Deadline: N/A
 Areas: Engineering, Physics, Chemistry, Math
 Eligibility: High school students
 Highlights: Comprehensive materials, self-directed learning, college prep
ocw.mit.edu

WHY THESE PROGRAMS MATTER

- Gain real research experience
- Work with top scientists & mentors
- Build skills for college & careers
- Explore your passions
- Stand out in college applications

YOU BELONG IN THE FUTURE OF SCIENCE!

START EXPLORING TODAY!

Visit the websites above to learn more, check eligibility, and start your application journey.

Scan to explore more STEM opportunities and resources!

Curious. Driven. Innovative.
That's what the world needs.

YOUR FUTURE. YOUR IMPACT. START NOW.

Program details, dates, and deadlines are subject to change. Always check the official website for the most up-to-date information. Updated May 2024

National STEM high school opportunities. Program details, dates, and deadlines are subject to change — always check the official website.

Sources & References

All wage and career data in this guide come from U.S. government sources. Figures are national medians and vary by experience, employer, and location. Tuition figures are approximate and set by each institution — always confirm current rates directly. All links were verified in June 2026.

Wage & career data

[U.S. Bureau of Labor Statistics, Occupational Outlook Handbook \(OOH\), May 2024 — median wages and 2024–34 job outlook for all occupations cited](#)

[Bioengineers & Biomedical Engineers \(median \\$106,950; +5%\) — BLS OOH](#)

[Electrical & Electronics Engineers \(electrical \\$111,910; electronics \\$127,590; +7%\) — BLS OOH](#)

[Chemical Engineers \(median \\$121,860; +3%\) — BLS OOH](#)

[Materials Engineers \(median \\$108,310; +6%\) — BLS OOH](#)

[Chemists & Materials Scientists \(chemists \\$84,150; materials scientists \\$104,160; +5%\) — BLS OOH](#)

[Data Scientists \(median \\$112,590; +34%\) — BLS OOH](#)

[Environmental Scientists & Specialists \(median \\$80,060; +4%\) — BLS OOH](#)

[Medical Equipment Repairers / BMET \(median \\$62,630; +13%\) — BLS OOH](#)

[Biological Technicians \(median \\$52,000; +3%\) — BLS OOH](#)

[O*NET OnLine — occupation characteristics and cross-reference for the roles above \(U.S. Dept. of Labor\)](#)

University & college cost / program pages

[University of Minnesota Twin Cities — College of Science & Engineering \(future undergrads\)](#)

[University of Minnesota — Cost of Attendance \(Office of Admissions; CSE surcharge \\$1,494/semester\)](#)

[University of Minnesota — One Stop tuition & cost of attendance](#)

[Minnesota State University, Mankato — College of Science, Engineering & Technology](#)

[Anoka Technical College — career pathways](#)

[Riverland Community College — Biotechnology A.S.](#)

[Minneapolis College — School of Science and Mathematics](#)

[Saint Paul College — academics](#)

[M State — academics](#)

Career self-assessment

[Career Values Card Sort — Carole Brown & Louisa Scagliotti \(icscareers.com.au\)](#)

The Future Is in Your Hands

Students entering high school today may work in careers that don't yet exist. Your future in biosensing starts with exploring what's possible — so dive in.

Discover. Explore. Innovate. Make an impact.