

Supplemental Material for NHSN Biotechnology Program
Letters of Support



Excellence in Action Committee:

On behalf of both CTE Directors in Nashua, the Assistant Superintendent of Secondary Schools for the Nashua School District and the Nashua High School North Principal, we would like to submit this letter recommending that the Biotechnology program at the Nashua Technology Center be given an Excellence in Action award.

Not only is the academic experience in the Biotechnology program rigorous and relevant, but the overall educational experience includes so much more. Students in Biotech are routinely asked to apply what they have learned in “real world” ways through discussions and debates, and the passion they express is a direct reflection of the commitment they see in their teachers.

Last year, I was able to attend the NH Science and Engineering Expo. At this event, students from across the state competed in a variety of categories including behavioral science, biochemistry, biology, chemistry, etc. Nashua High School had 15 students participate and four students received awards including 1st Place in Chemistry, 2nd Place in Biology, and 2nd Place in Biochemistry. These students created a question, researched it, went through the SRC approval process, carried out the experiment, analyzed the results, wrote a paper with their findings, created visuals and then finally presented the outcomes in a public setting. I watched as students shared their projects with adults, students, and judges in knowledgeable and professional ways. It was remarkable and impressive.

However, it is not my opinion that truly counts. I would reiterate that students finishing this program in Nashua feel completely prepared for fast paced college courses in veterinary science, biomedical engineering, and medicine. Many report that this class, not their AP classes, most prepared them for both their continued studies and/or future careers.

Please contact us if you have any questions.

Most respectfully,

Amanda Bastoni - CTE Director Nashua North High School
Michael McQuilkin - CTE Director Nashua South High School
Donna Fitzpatrick - Assistant Superintendent Nashua School District
Nathan Burns - Principal Nashua North High School



Dear Excellence in Action Award Committee,

I am pleased to provide a letter of highest recommendation for the Nashua Technology Center Biotechnology Program at Nashua High School North for the Advance CTE Excellence in Action Award. I have been fortunate to have been involved with the program, as either an instructor or as part of the advisory board for the past ten years.

The program's success is most easily demonstrated by seeing its impact to the careers of the students in the two year program. Through the combination of hands-on learning of real world skills, industry tours, guest speakers, and project-based learning, students have graduated from the program with the knowledge, abilities and confidence to continue in their career paths. Students not only go into careers in the biotechnology field, such as in pharmaceutical companies, and biomedical fields, but they utilize their skills in fields such as environmental technician, agriculture improvement, medicine, funerary services, and engineering. Students who are first in their family to attend college, and come from diverse ethnic and socio-economic backgrounds have gone on to successful careers in biotechnology, including continuing into doctoral programs.

The program has ties with both 2-year and 4-year institutions, including dual enrollment credit that students earn while in high school. The opportunities provided to students have included internships, industry trips, and a variety of professional guest speakers, which allow students to see how the skills they have learned can be applied in a variety of career pathways.

The program's advisory board has provided suggestions for new technologies, changes in skills and careers, and helped to shape and align the program's competencies to provide students the most relevant skills for a variety of related industries. As part of the advisory board, I provide information on the emerging technologies and skills for the field of biofabrication. The large scale manufacturing of engineered tissues and organs will provide solutions to the issues with organ transplant waiting lists, and potentially end the need for insulin injections and kidney dialysis. As these careers develop, this CTE biotechnology program is ensuring that students are both aware of the career pathways, and that they have the needed skills for this emerging workforce. Students in the Nashua CTE Biotech program were chosen to be part of a pilot project funded by ARMI|BioFabUSA in partnership the University of New Hampshire to expose high school students to the wide range of biotechnology manufacturing, including the business, clinical and regulatory aspects that involved with bringing these products to market.

Overall, this program continues to demonstrate to students, their families, the community, and the companies, that it delivers a valuable career and technical education, and I look forward to my continued work with them.

Sincerely,

Mary Q. Stewart, Ph.D.

Director of Education and Workforce Development for ARMI

Advanced Regenerative Manufacturing Institute - *Manufacturing the Future of Biofabrication*

Technology Center | 400 Commercial St. | Manchester, NH 03101 | www.armiusa.org

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Kimberly Beaudette
15 Grace Drive
Nashua, NH 03062
kbeaudette4@gmail.com

November 17, 2018

To Whom It May Concern:

It is a pleasure to recommend Nashua High School South's CTE Biotechnology Program for the Excellence in Action award. I am a parent of two boys that have experienced this program. My first son completed the two year program and my second son is currently enrolled in his first year of the program. I believe the instructors and the rigorous program content is of high quality and prepares students for careers in this field.

Throughout this program, I have been impressed with the cutting edge and up to date lab that provides the students with hands on, real life lab experiences. The advantages of having this state of the art lab are endless. Students explore a wide range of lab techniques and skills that give them experience and knowledge of possible medical or scientific careers. There are various experiences throughout the year that provide students with opportunities to explore and learn the skills that are critical to this field. They record data as they observe and analyze using the scientific method. A research project is completed and students present their findings and possibly are rewarded with a research grant.

The program provides students with the opportunity to participate in a field trip to a local company in this field. This has been wonderful for both of my children, as I'm sure it is for the other students, to see first hand how a company in this field operates. They are engaged in conversation with employees about their projects, equipment, and the many different jobs that are needed to make a company successful. This allows students to learn about the many different career opportunities available to them in this field.

Overall, the Biotechnology Program at Nashua High School South is a two year program that provides real world, hands on experiences for students by using state of the art equipment. In addition, this program provides many highly effective and authentic learning experiences that will prepare students for pursuing a career in this field.

Sincerely,

Kimberly Beaudette

To Whom It May Concern:

As a member of Nashua High School South's Class of 2017, I participated in the 2-year Biotechnology CTE Program at Nashua High School North. During the specific block that I had the class, I traveled from Nashua South to Nashua North. Even though traveling between the schools was sometimes a burden, the time that I spent learning these Biotechnology skills proved to be very valuable.

Currently, I am an undergraduate sophomore at Dartmouth College in Hanover, New Hampshire pursuing a double major in neuroscience and economics. Moreover, I am on the pre-medical track and hope to go to medical school. With the rigorous coursework and extensive research experience that comes with the premed curriculum (especially at an Ivy League school), it is vital to be able to possess strong lab skills and operate effectively in a laboratory.

Some of the more difficult lab courses that I have taken over the past year include Genetics, General Chemistry, and Organic Chemistry. With these classes, the entirety of the weekly lab period tends to last between 3 and 4 hours. With the time commitments that most experimental protocols require due to waiting times, one must understand how to work quickly and efficiently with chemicals and equipment. Without knowing the fundamental lab techniques that I learned in Biotechnology, including basic microscopy, proper pipetting technique, PCR, and DNA extraction, I would have struggled much more during lab. In addition to carrying out the lab experiment, it would take me time to learn these central lab techniques – by taking the 2-year biotechnology sequence, I did not have to spend this extra time and I was able to execute the experiment much more successfully, both because I already knew the skills and they were honed by performing them repeatedly over my 2 years in the program.

This past summer, I worked at Brigham and Women's Hospital in Dr. Lemere's neurology laboratory (whose focus is Alzheimer's Disease), which was working with NASA on an important project. By the mid-2030s, NASA hopes to organize a manned mission to Mars. However, before such an attempt, the risks of cognitive decline and AD pathogenesis as a result of exposure to chronic doses of deep space radiation are very real and must be considered. While working in this lab, I had the opportunity to learn about this transformative NASA endeavor, learn how to work in a laboratory environment with other peers, and also learn a trove of scientific techniques, including ELISA, mouse tissue cryosectioning, immunohistochemistry, double immunofluorescent staining, and computerized image analysis for plaque quantification. Taking Biotechnology helped me in the Lemere Lab to a great extent because I was able to transfer the wet lab skills from the class to staining procedures at the hospital. Given my familiarity with many of these skills, I finished most of my assigned tasks relatively quickly, which gave my mentor time to teach me other beneficial skills, including some data organization/analysis, image stitching, and helping other PhDs with their respective projects.

Taking Biotechnology in high school has provided me with skills that have been essential to my work in both the college laboratory and outside research laboratories, and will continue to be crucial to my work in future laboratories. Though I am a premed student, I think that this class would also be useful to prospective graduate students and can also provide people with an insight to the techniques and etiquette with which research is conducted in the real world.

Sincerely,
Khevna Joshi
Dartmouth College, Class of 2021

November 18, 2018

To whom it may concern,

My name is Katherine Amrein and I am currently a student at Worcester Polytechnic Institute where I am majoring in Chemical Engineering and minoring in Biology. I graduated Nashua High School North in 2017 where I participated in the biotechnology program my Sophomore and Junior years. I served as a CTE Ambassador for the program my junior year where I had to opportunity to spread my knowledge and passion for the subject to aspiring high school students the Nashua area. The biotechnology program, instructed by Mrs. Divya Nagri and Dr. Francine Brown, provided me with the skills and lessons to excel not only in biotechnology, but as a college student and in laboratory research in a myriad of other areas.

Most importantly, biotechnology at Nashua North fueled me with the passion and excitement to become a woman in STEM. Mrs. Nagri and Dr. Brown were sure to connect what we learn in the classroom or the laboratory to real life applications, ranging from industry to research. During my first year in the program, I remember feeling so profound in the fact that I could identify eight different bacterial strain based on different properties. I could look at a picture or listen to a description and answer with confidence and supplementary evidence. When I tell others, even fellow students at WPI, that I've changed a blue fluorescent bacterium into a green fluorescent bacterium through bacterial transformation and DNA plasmid splicing, they are shocked that I had that opportunity during high school. In my previous science classes, I had yet to have that feeling of sureness and awe. I've had incomparable hands on experience in a lab before my college years which allowed me to have unique insight and skills coming int college.

Translated into college studies, I was taught many specific terminologies in the biotechnology, pharmaceutical, and scientific industries through this CTE programs. As a chemical engineer, most people in the major veer towards the environmental or ecological route. However, I want to contribute to the pharmaceutical industry and because I have this background knowledge, I have been able to acquire internships in pharmaceuticals. I can speak to their common jargon as well as the amount of group work necessary to the field. Biotechnology placed me in situations with fellow classmates of varying knowledge, background, and ideas; this taught me how to work with a myriad of personalities all while completing the task at hand.

In addition to group work, the students had the opportunity to complete an Independent Research Project. During the year of completion, Mrs. Nagri was my instructor and she did an amazing job of pushing me to higher learning and understanding. My project was called *Melodious Microbes* and in it, I investigated how different genres of music effected the growth of *E. coli* and in turn how different equalization trends promotes bacterial metabolic function. The procedures used were not extremely challenging, however Mrs. Nagri was able to open my eyes to the many economic or social benefits of a proposed process like this. Although she wasn't my assigned instructor, Dr. Brown took time to assist me in the lab as well as data presentation. I completed in the New Hampshire Science and Engineering Exposition and won first place in the Biology division. This project has been a source of interest in internship interviews and college professors I've talked with because it provided me with anecdotes to self-

investigate personal curiosities and how an experiment, I could do impact the masses. I would have never been able to do this without Mrs. Nagri and Dr. Brown's support to investigate and take the chance.

I am very excited to hear of the opportunity of this award for Mrs. Nagri, Dr. Brown, and the Biotechnology program at Nashua North. I'm honored to speak of the excellent lessons academically, professionally, and socially that the program has instilled upon me. If there are any questions, please contact me at keamrein@wpi.edu.

Sincerely,

Katherine Amrein

To Whom It May Concern,

My name is Kavim Bhatnagar and I am a current first-year student at Worcester Polytechnic Institute (WPI) and a recent graduate of the Biotechnology CTE program at Nashua High School North. This program and its instructors, Dr. Francine Brown and Divya Nagri, have helped me tremendously in my STEM experience at WPI as well as helped me choose my major of choice, chemical engineering.

The biotechnology program at Nashua High School North is split into two years with the first year focusing on basic lab experience and the second year focusing on independent research. When I first step foot into the classroom, I was taken on a tour of the laboratory and coached on proper safety protocol, something that has translated into my lab experience at WPI. From that day onwards, I was taught entry-level lab techniques such as pipetting, creating stock solutions, and analyzing data both quantitatively and qualitatively. I used all three of these skills in my first two weeks of lab work at WPI and if not for this CTE program, I would have been “left in the dark” so to speak like many of my peers. In addition to these skills, I learned how to handle bacteria safely, create isolation streaks, and classify bacteria using qualitative analysis. I have yet to use these skills at WPI, however, I know without a doubt that they will reappear in higher level lab courses and the fact that I have already been exposed to these techniques is extremely advantageous.

During the second year of biotechnology, I was introduced to a new, self-driven project: The Independent Research Project (IRP). This assignment allowed me to develop a scientific question that could be answered through testable methods in the lab. Through this project, I was able to apply the scientific method in a practical manner on research that interested me, which was a first in my high school career. This included formulating a hypothesis, using peer-reviewed literature to perform background research, formulating a workable protocol to use in the lab, and conveying my findings through a well-written research paper. This project also marked the very first time that I was conducting research on my own without any “hand-holding” from a teacher or lab instructor. It excited me and at the same time prepared me for college lab experiences as at WPI, every single lab is run in a similar fashion. From performing background research to writing a detailed protocol, everything mimicked the experience I had with my own personal IRP and without this, the sudden change from high school to college

would have been jarring and stressful. However, this transition went smoothly and the research skills I learned proved extremely useful.

These two years cultured my love for lab work, and by combining this with my love for chemistry, picking chemical engineering as my major was one of the easiest decisions I made throughout the entire college application process. However, none of this would have been possible if it were not for the biotechnology program at Nashua High School North.

To whom it may concern,

As a former student, it is with my deepest pleasure to recommend Mrs. Nagri and Dr. Brown for the STEM CTE Excellence award.

I was honored to be a member of both of their first classes at Nashua High School North. What Mrs. Nagri and Dr. Brown have taught me and helped me accomplish during those two years in Biology Technology still have a lasting impact on me today.

It is a well-known fact that a student's passion for a subject is reflected by their teacher's commitment and their own passion for what they are teaching. Mrs. Nagri and Dr. Brown through their love for the class and material they taught me made me into the committed student I am today. The love I had for their CTE course has helped me with many life decisions including what college I should attend and the major I should peruse.

Thanks to both the efforts of Mrs. Nagri and Dr. Brown, I am a Dean's List student at Quinnipiac University studying Biomedical Sciences and I could not see myself in any other major.

Mrs. Nagri was my instructor for my first year of BioTech. I credit her to helping me create the foundations of my strong passion and fondness for the subject. Mrs. Nagri's vast knowledge of microbiology was only the tip of the iceberg of what made her such an amazing teacher. In the lab, she was engaged and constantly working hands on with her students, while in lecture she strived to make the material as interesting and clinically applicable as possible. By the end of my first year of BioTech, it was not a question of if I was going to return for my second year.

My second year of BioTech was instructed by Dr. Brown. Like Mrs. Nagri, this was Dr. Brown's first year in teaching the subject. Also like Mrs. Nagri, Dr. Brown did not allow her first year to impact the quality of her teaching. Dr. Brown gave me a different view of the science with her expertise being more from chemistry than microbiology. This different view allowed me to see BioTech from an entirely different angle. BioTech was not an easy subject, but Dr. Brown was always patient and took her time to ensure that her students understood the material. In lab, Dr. Brown created the perfect atmosphere where students could retain knowledge and enjoy it while doing it.

Both Dr. Brown and Mrs. Nagri are engaged educators who only want the best for their students. They're personable, easy to approach, and always more than willing to help their students in any way possible. These qualities are sometimes hard to come by so when you have instructors with these traits, you know that you will not only learn a lot with them but have fun while doing it. Together, they created a classroom I kept wanting to come back to even after I finished my two years with them. That classroom became part of my identity during my high school career- an identity I'm proud of.

Mrs. Nagri and Dr. Brown continue to set the standard for what I consider a good class to be even as I go through my second year of college. With that being said, they also continue to be two of the best teachers I have ever had. I could not think of two teachers more committed or more deserving of this award.

Sincerely,

Isabel Dunning

Newspaper Article July 9, 2017

Four females share biotech honors from Nashua Technology Center.

Biotechnology: The way up in four directions

By LORETTA JACKSON

Correspondent

NASHUA – The perennial parental inquiry: What did you do in school today? Students in the biotechnology program at Nashua Technology Center (NTC), a part of Nashua High School North, might answer, “We cultured bacterium, spliced genes and studied cancer cells.” And don’t forget: “We cloned carrots!” That addendum came from recently graduated senior Isabel Dunning, 18, of Nashua. She said stem cells were used to replicate the carrots.

Dunning is one of four females who aced the two year biotechnology program at NTC. The ladies were ranked among the top 10 of 384 seniors who graduated in June at SNHU Arena in Manchester. The four sat onstage that day with others of distinction. The group includes Isabel Dunning, Kate Amrein, Kristina Fields and Khevna Joshi. All are 18 and live in Nashua.

Three of the four lab mates discussed their next moves at a recent confab at the high school with Michelle Voto, director of the Career and Technical Education department, and NTC biotechnology teachers, Divya Nagri, MSE, and Francine Brown, PhD. Classmate Joshi was on vacation when a group photo was taken, but commented about her plans on July 5 during a visit to the lab.

Dunning said she will go to Quinnipiac University in Hamden, Conn., for premed training. She said that biotech changed her life and helped her decision to become an oncologist, a cancer doctor. Dunning studied microbes, bacteria, cancer cells and others at NTC. The biotech program emphasized science, technology, engineering and math (STEM). All agreed it is a field with the potential to help humanity.

“I want to become an oncologist,” Dunning said. “I learned about cancer

BIOTECHNOLOGY | PAGE A-2

Biotechnology | A total of fifteen programs are offered at NTC

CONTINUED FROM | PAGE A-1

in biotech. I want to help people and I want to do something I love. It’s a job where each case is different.”

Amrein is headed for Worcester Polytechnic Institute (WPI) in Worcester, Mass., and will study chemical engineering. She said her interest in genetics is behind her intention to unravel the dynamics contributive to illnesses including diabetes and

autoimmune diseases. “Why is the body attacking itself?” Amrein asks. “The body is a beautiful thing. Every part of it has a job to do. I want to find the cure, or at least be a part of the research to find a cure.”

Kristina Fields is headed for Georgia Institute of Technology in Atlanta, Ga., and a course of study blending bioengineering and aerospace engineering. She said the hands-on, scientific investigations she mastered at NTC inspired her to head for the aerospace industry. “I want to be an astronaut on the bio-science side of things,” Fields said. “The sciences have helped me develop my passion. I got experience in the lab and in designing my own experiments, as well as working with other people in solving problems.”

Joshi will attend Dartmouth College in Hanover and will tackle neuroscience and bioengineering. She said that the biotech program taught her many of the techniques and concepts used in the modern workplace. “Biotechnology has helped me to confirm my love for science and working in the lab,” Joshi said. “Realizing my passion for science let me choose a major that aligned with this track.”

Joshi added that she now has an appreciation for the role that technology plays in science. She learned about bioinformatics – the science of gathering and analyzing biological data including genetic codes – in addition to centrifugal separation of biological samples and much more. “Technology can be harvested to create more accurate and precise results in science experiments,” said Joshi. “That’s something that is desirable.”

Students from Nashua High School North, Alvirne High School in Hudson, Merrimack High and Nashua High School South all participate in the biotechnology program at NTC. Joshi was a graduate of Nashua South, but traveled to North to take the program. There were 14 girls and three boys in the most recent class.

Teacher Nagri, who earned her Bachelor of Science degree in chemical and biomedical engineering at Massachusetts Institute of Technology (MIT) and a Master of Science in Engineering in chemical and biomedical engineering from John Hopkins University, said the grads now have valuable and marketable skills. “Most students learn these skills in college or graduate school,” said Nagri. “Our students learn these skills in high school.”

Fifteen programs are offered at NTC, noted Francine Brown, Ph.D., a fellow biotechnology teacher at NTC. “Some students opt for biotechnology while others select automotive technology, cosmetology, computer networking, electrical trades or culinary arts,” Brown said. “The choices are many and any interested student should ask about them.” Michele Voto, director of the Careers and Technical Education department, looked around the lab. There were beakers and slides and pipettes and microscopes, along with state-of-the-art testing equipment rarely found in a high school setting. She commended everyone’s achievements.

“Not only did these students complete two years of a rigorous STEM focused, lab-skills-based program for which they received college academic credit, they maintained the academic excellence required to be in the top 10 of their graduating class,” Voto said. “They also have completed independent research projects and presented their original research at the New Hampshire Science and Engineering Expo held in March.”

All four received awards for their presentations, Voto added.

‘Most students learn these skills in college or graduate school. Our students learn these skills in high school.’

DIVYA NAGRI

An instructor at the Nashua Technology Center, part of Nashua High School North.



The biotechnology program at the Nashua Technology Center, a part of Nashua High School North, this year graduated four girls who placed among the top 10 in a class of 384 seniors. Three of the four are seen here along with some of the staff members of the technology center. From left, Dr. Francine Brown, instructor; Michelle Voto, director for Careers & Technical Education; Divya Nagri, instructor; and graduates Isabel Dunning, Kristina Fields and Kate Amrein. Classmate Khevna Joshi was away on vacation at photo time.

Correspondent photos by **LORETTA JACKSON**



Khevna Joshi, along with three of her biotech classmates at Nashua Technology Center, aced the courses and graduated in the top 10. Joshi now is headed for Dartmouth College where she will tackle bioengineering and neuroscience.

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Career Pathway Plan of Study with Great Bay Community College

This Career Pathway Plan of Study can serve as a guide. Courses listed within this plan are only recommended coursework and should be individualized to meet your educational and career goals.

High School: Nashua Technology Center **Program:** Biotechnology
College: Great Bay Community College **Program:** Biotechnology

Career Pathway Plan of Study for ► Learners ► Parents ► Counselors ► Teachers/Faculty

BOLD, UNDERLINED & ALL CAPITALS -
 Transcribed Dual Enrollment Credit

Bold & Underlined – Articulated Credit
Italic – Imbedded Academic Core Credit

Bold – Prerequisite for College Success
 Black – High School Requirement

Grade	English/ Language Arts	Math	Science	Social Studies /Sciences	Other Required Courses (R) Recommended Electives (E)	*Career and Technical Courses and/or Degree Major Courses	SAMPLE Occupations Relating to This Pathway
9	English 1	Pre-Algebra OR Algebra I OR Geometry	Physical Science	World Studies	Physical Education (R) Art (R)		► Process Technician ► Lab Technician/Analyst ► Quality Control Technician ► Metrologist ► Research Assistant ► Quality Assurance ► Validation Specialist ► Genomics ► Bioinformatics ► Forensic Scientist ► Management ► University Professor ► Manufacturing Associate ► Pharmaceutical Scientist
10	English 2	Algebra I OR Geometry OR Algebra II	Biology		Physical Education (R) Health (R) Computer Apps. (R)		
11	English 3	Geometry OR Algebra II OR Adv. Math Topics/ Pre- Calculus/Calculus	Chemistry	US History		Biotechnology 1	
12	English 4 or English Electives OR <u>ENGLISH 4 HONORS</u>	Algebra II OR Pre- Calc/Calculus OR Probability & Statistics OR AP Stats*		<u>HUMAN RELATIONS</u> OR <u>PSYCHOLOGY</u>		<u>BIOTECHNOLOGY II</u>	

Associate Degree: Biotechnology, Great Bay Community College							
Grade	English/ Language Arts	Math	Science	Social Studies /Sciences	Other Required Courses (R) Recommended Electives (E)	*Career and Technical Courses and/or Degree Major Courses	SAMPLE Occupations Relating to This Pathway
13	<u>COLLEGE COMPOSITION I</u>	College Algebra**	General Biology (I) &II General Chemistry I		Introduction to Computers (R) Foreign Language/Humanities/Fine Arts Elective (R)	<u>INTRODUCTION TO BIOTECHNOLOGY</u> Bioethics Principles of Genetics	
14	Writing Technical Documents	Probability & Statistics	General Chemistry II Microbiology Biochemistry	<u>SOCIAL SCIENCE ELECTIVE</u>	Foreign Language/Humanities/Fine Arts Elective (R) Technical Elective (R)	Biotech Experience I: Discovery Research Biotech Experience II: Biomufacturing	
The Great Bay Community College Associate Degree in Biotechnology includes core foundational courses for a variety of Bachelor's Degrees in the Biological Sciences.							

Notes:
 Accuplacer Scores required for placement:
 English: WPS score of 8 or higher; Reading score of 65 or higher
 Math: Elementary Algebra score greater than or equal to 76
 *Math elective in the senior year, highly recommended
 ** A higher lever math course may be substituted for College Algebra.



S E C O N D A R Y

P O S T S E C O N D A R Y

Exploring Biotechnology Jobs

Pg 18: Biotech Online

Genentech, Inc.'s Product Pipeline

Genentech, Inc. is a good example of how a company can have several different products in different stages of the production pipeline. Genentech focuses on pharmaceuticals to treat cancer, cardiovascular disease, and diseases of the immune system. In 2015, Genentech had more than 40 pharmaceutical products in research and development, clinical trials, or awaiting FDA approval.

To Do: Visit Genentech, Inc.'s pipeline status Web page at biotech.emcp.net/genepipeline to see where Genentech products are in the development pipeline. From the Genentech pipeline, pick a product being developed to treat a type of cancer. Record three interesting facts about the drug or its potential use.

Pg. 26: Biotech Online

Finding "Hot Jobs"

Many websites, including biotech.emcp.net/biospace, biotech.emcp.net/biofind, biotech.emcp.net/sciencejobs, and biotech.emcp.net/lifescienceworld, post job descriptions and want ads for biotechnology employment.

To Do: Go to one of the four biotechnology job-finding websites listed above. Find a company offering a position as a quality control analyst, technician, or any other job that you find interesting. Record the following:

The company offering the job

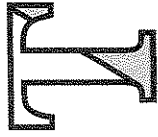
The actual title of the job or position and a description of the job duties

The starting salary for the position (or salary range)

The website URL for the position

The education (degrees) required for the position

Nashua High School North Core Values & Beliefs
and
21st Century Learning Expectations
and
Mission Statement



Nashua High School North

Core Values & Beliefs

21st Century Learning Expectations

Mission Statement

STRENGTH THROUGH COMMUNITY	LIFELONG LEARNING	INTELLECTUAL GROWTH	PERSONAL RESPONSIBILITY
<ul style="list-style-type: none">▶ Relationships▶ Diversity▶ Empathy▶ Unity	<ul style="list-style-type: none">▶ Relevance▶ Collaboration▶ Discovery▶ Work Ethic	<ul style="list-style-type: none">▶ Rigor▶ Competence▶ Excellence▶ Inquiry	<ul style="list-style-type: none">▶ Respect▶ Accountability▶ Compassion▶ Integrity
TWENTY-FIRST-CENTURY LEARNING EXPECTATIONS			
<ul style="list-style-type: none">✓ Responsibility✓ Problem Solving✓ Communication✓ Citizenship	<ul style="list-style-type: none">✓ Responsibility✓ Problem Solving✓ Communication✓ Citizenship	<ul style="list-style-type: none">✓ Responsibility✓ Problem Solving✓ Communication✓ Citizenship	<ul style="list-style-type: none">✓ Responsibility✓ Problem Solving✓ Communication✓ Citizenship

Mission Statement

The mission of Nashua High School North is to create a safe, respectful community, which embraces our diversity and provides a foundation for lifelong learning while promoting intellectual growth and personal responsibility.

Pictures of Students at NHSEE, MIT, MilliporeSigma, and Corning Life Sciences











Community Outreach

Friday Evening Lectures 2018

Lillie Auditorium, 8:00 PM

FRIDAY, JULY 13



Frugal Science in the Age of Curiosity

Manu Prakash, *Stanford University*

Introduction by Hari Shroff, *Senior Investigator, National Institute of Biomedical Imaging and Bioengineering*
MBL Fellow

Science faces an accessibility challenge. Although information/knowledge is fast becoming available to everyone around the world, the experience of science is significantly limited. One approach to solving this challenge is to democratize access to scientific tools. Manu Prakash believes this can be achieved via “Frugal science”; a philosophy that inspires design, development, and deployment of ultra-affordable yet powerful scientific tools for the masses. Using examples from his own work (Foldscope: one-dollar origami microscope, Paperfuge: a twenty-cent high-speed centrifuge), Dr. Prakash will describe the process of identifying challenges, designing solutions, and deploying these tools globally to enable open ended scientific curiosity/inquiries in communities around the world. By connecting the dots between science education, global health and environmental monitoring, he will explore the role of “simple” tools in advancing access to better human and planetary health in a resource limited world.

Manu Prakash is Assistant Professor of Bioengineering at Stanford University working in the field of physical biology and frugal science. He combines his passion for basic science with development of affordable and accessible technologies that can be used for science education, research, and public health in resource poor settings with the goal of democratizing access to scientific tools. He is best known for developing the ultra-low-cost paper microscope Foldscope and Paperfuge, a 20-cent hand-powered centrifuge made of paper and string. He is a 2016 recipient of the MacArthur Fellowship, an HHMI-Gates Faculty Scholar, and in 2015 he received the National Geographic Emerging Explorer distinction and the NIH Director’s New Innovator Award, among many other recognitions.

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