Corey James Predella

Mobile: 508-981-4908

♢1 Education

Carnegie Mellon University, B.A. Mathematics, 2023-2027

Societies: Dean's list with high honors, CMU Honors math student, CMIMC problem-writer, Math club, Chess club

Major GPA: 4.0/4.0

GPA: 3.76/4.0

Beaver Country Day School (Cum Laude), 2018-2022

Societies: Upper school president, student government, competetive programming team founder & head, physics club president

Awards & Honors: Alex Cohn Grant recipient, Faculty prize recipient, Mente et Manu prize recipient, Cum Laude Society, High Honor roll, TEDx event speaker, SAT math perfect score

GPA: 4.2/4.0

♢2 Work Experience

TA & Substitute Instructor, AwesomeMath Summer Program: May 2023 - August 2023

- Assisted in training students for top-tier math contests like AIME and USAMO.
- Conducted problem-solving workshops, providing strategic hints and solutions.
- Evaluated and provided constructive feedback on proof-based assignments and exams.
- Facilitated online forums and office hours, clarifying complex mathematical concepts.
- Monitored and recorded student academic progress and attendance.

Teacher, NuVu Innovation School: August 2022 - June 2023

- Collaboratively designed and co-taught innovative, seminar-style courses, integrating interdisciplinary approaches to enhance student learning experiences.
- Led the creation of dynamic, project-based learning modules, tailored to foster critical thinking and problem-solving skills among students.
- Implemented effective teaching strategies to facilitate a deeper understanding of complex concepts, ensuring a high level of student engagement and academic achievement.

Research Intern, Cardiovascular Engineering Inc: May 2022 - August 2022

- Conducted in-depth, computational research in cardiology, photoplethysmography, and arterial blood pressure.
- Developed an AI deep learning model using TensorFlow 2.0, NumPy, and Scipy to predict arterial blood pressure waveforms from photoplethysmographic data.
- Innovated U-networks, W-networks, and Ladder-networks to enhance accuracy in waveform convolution processes.

Instructor, Code Ninjas, September 2019 - May 2022

- Served as a coding instructor and curriculum developer for an after-school program catering to children aged 7-14.
- Authored and implemented an 'AI with Python' course, later adopted as a camp program at various national locations.

♢3 Computer Proficiencies

Programming Languages: C, JavaScript, Python, C++, Julia
Programming Concepts: Algorithms, Data Structures, Elementary Machine Learning, NumPy, Matplotlib, Scipy, TensorFlow, Keras
Computer Programs: LaTeX, Excel, Adobe Premiere Pro, Ableton Live 10, Fusion 360, Notion

♢4 Certifications

CITI Good Clinical Practice Biomedical Course, CITI Medical Campus Biomedical Researchers, CITI Community-Engaged Research, CITI Conflicts of Interest.

♢5 Mathematical Coursework & Teaching

♢5.1 Present Coursework

2024 - 21-269: Vector Analysis, Carnegie Mellon University Functions of several variables, regions and domains, limits and continuity, sequential compactness, partial derivatives, linearization, jacobian, chain rule, inverse and implicit functions and geometric applications, higher derivatives, taylor's theorem, optimization, vector fields, multiple integrals and change of variables, Leibnitz's rule, line integrals, Green's theorem, path independence and connectedness, conservative vector fields, surfaces and orientability, surface integrals, divergence theorem and Stokes's theorem.

2024 - 21-127: Concepts of Mathematics, Carnegie Mellon University Symbolic logic, equivalence, variables and quantifiers, sets, set operations, functions, Peano's axioms, weak induction, strong induction, equivalence relations and partitions, finite sets, countability and uncountability, division, primes, modular arithmetic, counting principles, inequalities, sequences and series, convergence, cardinal arithmetic, discrete probability spaces, random variables.

♢5.2 Past Coursework

2023 - 21-241: Matricies and Linear Transformations, Carnegie Mellon University linear equations, row reduction, echelon forms, vector equations, matrix equation $Ax = b$, solution sets of linear systems, linear independence, linear transformations, matrix operations, matrix inverse, invertible matrices, matrix factorizations, determinants, vector spaces, subspaces, null spaces, column spaces, bases, coordinate systems, dimension of vector space, rank, change of basis, eigenvectors, eigenvalues, diagonalization, complex eigenvalues, discrete dynamical systems, inner product, length, orthogonality, orthogonal sets, orthogonal projections, Gram-Schmidt process, least-squares problems, diagonalization of symmetric matrices, quadratic forms, singular value decomposition. **Grade: A**

2023 - 21-122: Integration and Approximation, Carnegie Mellon University Advanced integration techniques, sequences and series, Taylor polynomials and Taylor series, radius and interval of convergence, differential equations, vectors in $\mathbb{R}^3$, dot and cross products. **Grade: A**

2022 - Math E-23a: Linear Algebra and Real Analysis I, Harvard University
Quantifiers, Sets, Functions, Fields, Matricies and Linear Transformations, Dot and Cross Products; Euclidean Geometry of $\mathbb{R}$, Row reduction, Independence, Basis, Eigenvector and Eigenvalues, Number Systems and Sequences, Series, Convergence, Power Series, Limits and Continuity of Functions, Derivatives, Inverse Functions, Taylor Series, Topology, Sequences and Series in $\mathbb{R}$, Differential Equations, Limits and Continuity in $\mathbb{R}$, Partial Derivatives, Differentiability, Newton's Method, Inverse Functions, Implicit Functions, Manifolds, Tangent Spaces, Critical Points, Lagrange Multipliers. **Grade: P**

2022 - Math E-16: Calculus II, Harvard University
Definate Integrals, Antiderivatives, and Direct Substitution, Integration by Parts, Partial Fractions, Integration Tables, Numerical Approximations, Improper Integrals, Applied Calculus in Geometry, Densities, Economics, and Probability Theory, Differential Equations, Slope Fields, Euler's Method, Seperation of Variables, Applications of Differential Equations, Geometric Series and Convergence Tests, Taylor Polynomials and Taylor Series **Grade: P**

2022 - A3.5: Advanced Algebra 3.5, AwesomeMath Summer Program
Fields, Rings, Polynomial Roots, Polynomial Divisibility, Euclidean Algorithm, Lagrange Interpolation, Irreducibility, Euclid's Lemma, Primitive Polynomials, Gauss Lemma, Ostrowski's Criterion, Eisenstein's Criterion, Perron's Criterion, Schonemann s Criterion, Kronecker Algorithm, Multivariate Polynomials, Symmetric Polynomials, Newtonian Sums, Cauchy Formulas, Algebraic Numbers, Mahler Measure, Kronecker's Theorem, Cauchy-Schwarz Inequality, Aczel's Inequality, Titu's Lemma, Rearrangement Inequality, Chebyshev's Inequality, Bernoulli's Inequality, Holder's Inequality, Minkowski's Inequality, Jensen's Inequality, Nesbitt's Inequality, Karamata's Theorem, Muirhead's Inequality, Popoviciu's Inequality, Monotonicity, Convexity, Functional Equations, Cauchy Equation, Continuity, Bounds, Injectivity, Surjectivity, Bijectivity, Reccurent Sequences, Homogeneous and Nonhomogeneous Recurrences **Grade: P**

2022 - NT3: Advanced Number Theory 3, AwesomeMath Summer Program Bezout's Identity, Chinese Remainder Theorem, Wilson's Theorem, Fermat's Little Theorem, Euler's Theorem, Exponent of Prime, Legendre's Formula, Lifting the Exponent Lemma, Order Modulo p, Primitive Roots, Cyclotomic Polynomials, Prime Divisors of $\Phi_n(a)$, Weak Dirichlet Theorem, Zsigmondy's , Central Binomial Technique, Chebyshev's Estimates, Bertrand's Postulate, Mertens Estimates, Quadratic Reciprocity, Counting Points Modulo p, Points on Spheres, Gauss Sums, Groups, Rings, Fields, Integral Domains, Unique Factorization Domains, Residue Rings, Reduction Maps, Ideals, Thue's Lemma, Fermat's Christmas Theorem, Diophantine Equations, Zeta Functions, Chevalley-Warning and Erdos-Ginzburg-Ziv Theorems, p-adic Numbers, Hensel's Lemma, Skolem-Mahler-Lech Theorem **Grade: P**

2022 - CO2: Combinatorics 2, AwesomeMath Summer Program Basic Counting Techniques, Set Theory, Permutations, Combinations, Binomial Coefficients, Pascal's Triangle, Binomial Theorem, Vandermonde's Identity, Hockey-stick Identity, Stars and Bars, Principle of Inclusion Exclusion, Recursion, Bijections, Generating Functions, Probability, Expected Value, Random Walks, Graph Theory, Exponential Generating Functions, Automorphisms **Grade: P**

2021 - SDP: Abstract Algebra, Beaver Country Day School
Modular Arithmetic, Induction, Equivalence Relations, Functions, Symmetry, Groups, Dihedral Groups, Cayley Tables, Subgroups, Ring Homomorphisms, Cyclic Groups, Permutation Groups, Isomorphisms, Automorphisms, Cosets, Lagranges Theorem, External Direct Products, Normal Subgroups, Factor Groups, Burnside's Lemma **Grade: A**

2021 - SDP: Discrete Math and Proof Writing, Beaver Country Day School
Propositions and Connectives, Conditionals and Biconditionals, Quantifiers, Mathematical Proofs, Set Theory, Set Operations, Induction, Principles of Counting, Cartesian Products and Relation, Equivalence Relations, Bijections, Finite, Infinite, and Countable Sets **Grade: A**

♢5.3 Teaching

2019-Present - Private Math & Computer Science tutor
2023 - TA & Substitute, Number Theory 2, AwesomeMath Summer Program
2023 - TA, Algebra 2.5, AwesomeMath Summer Program
2023 - TA, Combinatorics 2, AwesomeMath Summer Program
2023 - Instructor, NuVu Thinking Problem Solving Seminar, NuVu Innovation School
2022-2023 - Co-instructor, Algorithmic Art, Renewable Design Space, Computing in the Community, Time to Relate, Health Sense, NuVu Innovation School
2020-2022 - Instructor, BVR HAX, Beaver Country Day School
2019-2022 - Instructor, Code Ninjas

References available upon request

Secondary School Report

791 Hammond St., Chestnut Hill, MA 02467
Telephone: 617 738-2700 Fax: 617 249-0609
www.bcdschool.org School Code: 220595

Predella, Corey J

2 Flint Locke Lane, Medfield, MA 02052
Birth date: 10/16/2003 **Year of Graduation:** 2022

Y18-19 Grade 9	Tri 1	Tri 2	Tri 3	Creds
English 9: What's Power?	A-			5
English 9: Friend or Foe?			A	5
Algebra II A (H)	A			5
Algebra II B (H)		A		5
Hist I US: Nationalism		A		5
Hist I US: Age of Reforms			A	5
Conceptual Physics B (H)			A	5
Conceptual Physics A	A			5
Spanish Fnd: Social Life (H)		A		5
Spanish Fnd: Home Life	A-			5
Music: Instrumental Ensemble I A.		A		5
Music: Instrumental Ensemble I B.			A	5

Y19-20 Grade 10	Tri 1	Tri 2	Tri 3	Creds
English 10: American Identity (H)	A			5
English 10: American Morality (H)			A	5
Geometry A (H)	A			5
Geometry B (H)			A	5
Hist II US: Power/Superpower (H)			A	5
Chemistry Foundations (H)	A			5
SDP: Astrophysics and Cosmology			A	5
Spanish Int: Entrepreneur (H)			A	5
Music: Instrumnt Ens II A	A			5
NuVu Program Winter		P		20

Distinctions:
High Honor Roll: 9,10,11,12
Faculty Prize: 12
Mente et Manu Student Council: 12

Cum Laude Society

Y20-21 Grade 11	Tri 1	Tri 2	Tri 3	Creds
English 11: View Within(H)			A	5
English 11: View Outside(H)		A		5
Precalculus: Functions (H)	A			5
Precalculus: Trigonometry(H)		A		5
SDP: Algorithms		A		5
SDP: Proofs in Discrete Math			A	5
Hist III: Empires to Indep. (H)		A		5
Hist:Governments of the World(H)			A	5
Biology Foundations (H)	A			5
Chem Apps: Physical Chemistry (H)			A	5
AdvPhys: Mech (H)	A			5
Spanish Int: Urban Life (H)		A		5
Spanish Int: Identity 21st Century(H)	A			5
Music: Cuban Jazz Ensemble	A	A	A	10

Y21-22 Grade 12	Tri 1	Tri 2	Tri 3	Creds
Engl: Literature & Film (H)	A			5
Engl: Science Fiction (H)			A	5
SDP: Abstract Algebra/Group Theory		A		5
Discrete Math and Adv. Topics			A	5
AdvCalculus-Derivatives (H)	A			5
AdvCalculus-Integrals (H)		A		5
Hist:The Media/Influence (H)		A		5
Adv Hist: Theories of Punishment (H)			A	5
Bio Apps: DNA & Gen (H)		A		5
AdvPhys: E&M (H)	A			5
Adv Spanish: Environments in Crisis (H)			A	5
Music: Instrumnt Jazz Combo A	A			5
Music: Instrumnt Jazz Combo B		A		5

Graduation Date: 06/10/2022

Grade 9 GPA: 4.1
Grade 10 GPA: 4.3
Grade 11 GPA: 4.3
Grade 12 GPA: 4.3
Cumulative GPA: 4.2

Minimum Pass Marked: D- Other Passing Marks A = (93-100); A- = (90-92); B+ = (87-89); B = (83-86); B- = (80-82); etc.
All courses are standard unless marked: H = Honors.
Additional information regarding course credit, class ranking, grade distribution, curriculum, and college attendance is provided on our school profile.

Certifying Official
Head of School: Kimberly Samson

Registrar
June 22, 2022

NuVu The Innovation School

FINAL STUDENT REPORT FOR: Corey Predella
SESSION: Winter 2019
ATTENDANCE: Absences: 2 Tardies: 0 Total School Days: 57 **FINAL**
PASS/FAIL GRADE: Pass

NUVU STUDIO MODEL:

Corey Predella took part in the Winter 2019 Term at NuVu Studio. NuVu is an innovative full-time educational program whose pedagogy is based on the Architectural Design Studio model, where a coach guides students in hands-on problem-solving to tackle complex, comprehensive problems. NuVu students acquire a highly personalized understanding of the world and how they relate to it through a multidisciplinary framework.

Academic learning at NuVu is focused on instilling a passion and growth mindset within our students for work and life experiences that lie ahead. Our curriculum is driven by collaboration, rigor, experimentation and creation. With this self driven approach, students create a unique culture and their own paths to college and beyond.

Working in teams across disciplines and ages, students must draw on new skills and knowledge to deliver a project within a two or three-week deadline, document their process and present to a group of peers and advisors. They are questioned, pushed and driven to examine not only their successes – but their failures.

Each NuVu trimester runs for 11-12 weeks, during which each student participates in a sequence of three to four Studios. As a core part of our educational pedagogy, NuVu does not administer grades. Instead, students receive evaluations from their coaches on areas of growth and of improvement every two to three weeks and participate in an end of studio presentation with open critique from experts, coaches, and peers. Students also complete self-evaluations after every Studio throughout the year to reflect on their personal challenges and progress.

SKILLS DEVELOPED AT NUVU:

Design Skills:	**Subject Skills:**	
Engagement Collaboration Synthesising Critique Innovation Iteration Critical Thinking Documentation Communication	Electronics Design & Fabrication Sewing & Pattern Making CAD 2D/3D Parametric Modelling Drawing/Illustration Diagramming	Programming: Arduino Writing: Expository Interviewing Electronics

TEL: +1 617-417-4608 | EMAIL: jenny@nuvustudio.org
450 Massachusetts Ave, Cambridge, MA 02139 | nuvustudio.org

NuVu The Innovation School

COMMENTS ON STUDENT PERFORMANCE:
Corey Predella took part in the Winter 2019 Term at NuVu, completing his studies in March 2020.

While at NuVu, Corey:

- **Design Skills**: From the outset Corey showed great interest and proclivity for both the iterative design process and the technical skills taught at NuVu. He showed a consistent willingness to seek out and respond to critical feedback, clearly communicate the design intent for both himself and his teammates, and lay out a clear plan for accomplishing his goals. Corey is a convincing presenter and works hard to communicate his work orally, visually, and through writing.
- **Academic & Personal Growth**: Corey is a strong and sensitive collaborator, attuned to the skills and personalities of his partners, and able to respond to their needs and the needs of the project with grace and poise. He is a diligent and committed worker, a trait that made him a role model for younger students and a natural thought and project management leader within his teams. This was most evident in the series of robotics projects for which Corey was the primary binding force. Corey is a strong contributor to group discussions, responding thoughtfully and helping other students draw out their ideas. His positive attitude and strong work ethic consistently enrich the NuVu Studio environment.
- **Key Accomplishment:** While Corey shows a keen sense for whimsical physical design (such as the 'Sunbrarow' social sunwatching hat from the "Symbiosis Studio") his strongest work at NuVu was in robotics and mechatronics. In a series of studios, beginning with "EQ-Bots"and ending with his Open Innovation project 'The Sharing Bot' (a continuation of a project from the previous studio), Corey developed as a conceptual designer, programmer, and physical mechatronics designer exploring the boundary between human emotion and reaction and robotics. His commitment to advancing his skills, his leadership within a challenging and complex group setting, and his commitment to project management and completion made this work extremely successful.

Link to Student Portfolio:
https://cambridge.nuvustudio.com/corey-predella

Sincerely,

Jenny Kinard, **3.12.2020**
Director, NuVu Program