



Dartmouth

HANOVER • NEW HAMPSHIRE 03755

THE PRESIDENT

March 26, 2010

Google Fiber for Communities Project
Google Inc.
1600 Amphitheatre Parkway
Mountain View, CA 94043

To Whom It May Concern:

On behalf of Dartmouth College, I am writing to express our strong support of the Upper Valley Fiber Initiative for the Google Fiber for Communities project. UVFI's application is the work of three local organizations that have been pursuing a high-speed Internet network for the region:

- *ValleyNet* is an independent non-profit founded by Dartmouth in 1994 to provide and facilitate community-based information resources for the Upper Connecticut River Valley region of New Hampshire and Vermont. After serving as the primary Internet Service Provider for residents of the Upper Valley for many years, ValleyNet has streamlined its mission to focus primarily on broadband advocacy.
- *New Hampshire FastRoads* is a collaboration among the New Hampshire Community Development Finance Authority, 35 towns of the Monadnock region of southwest New Hampshire, the Monadnock Economic Development Corporation, and WCNH, a coalition of 8 towns in west central New Hampshire, including Hanover, where Dartmouth is located.
- *ECFiber* is a community-owned, subscriber-funded organization representing 23 towns in East Central Vermont was founded several years ago to bring a fiber-optic network to subscribers in these towns.

Dartmouth supports their application with great enthusiasm, and we anticipate taking an active role in terms of research, deployment, and innovation. The College brings experience, passion, and a culture of computing innovation. Over the last 50 years, it has been the birthplace for at least **four significant breakthroughs** increasing the scope and breadth of computing.

- In **1959**, two Dartmouth math professors, John Kemeny and Tom Kurtz, in a radical step forward, **gave students free access to Dartmouth's first computer**, a Royal McBee LGP-30. "For the first time our students acquired hands-on experience with computers, and we were absolutely amazed at the ingenuity and creativeness of a few exceptional

undergraduates,” Kemeny later wrote. Three years later, in 1962, Kurtz proposed that all students should learn to use the computer. The suggestion, Kemeny wrote, was “way ahead of its time.”

- In **1964**, Kurtz and Kemeny used a GE-235 and Datnet 30 to take on a challenge no one in the computer world had solved yet: **making computers serve multiple users through a system of time-sharing**. Professors and undergraduates worked together to create a time-sharing system and the BASIC code to run it. After four months of intensive work, they succeeded. By the fall term of 1964, the campus was served by more than 20 terminals, allowing students and faculty from various fields to develop previously unimagined uses for the computer. Their efforts later led General Electric to launch a very profitable time-sharing business. More importantly, the vision of computing as a part of everyday life began to be realized.
- In **1984**, Dartmouth was the first college to strongly recommend all students including freshman **bring a personal computer to campus**. In support of this, Dartmouth’s Trustees approved the inclusion of the cost of the preferred student computer at the time, the Apple Macintosh, in the formulation for financial aid. That year, Dartmouth became the first fully networked campus. Various applications were created as a result of the network, including Blitzmail (an email client), Fetch, and Intermapper.
- In **2001**, Dartmouth became **the first wireless campus** in the Ivy League. *Wired* magazine reporter Josh McHugh visited the College and observed that the network

“is subtly but profoundly altering teaching techniques, social interaction, study habits, and personal security. In spite of its remoteness, the college has long been one of the most wired places on earth, fashioning its campus into the prototype of the fully wireless, always connected community: a microcosm that provides a peek at what our residential neighborhoods and office spaces may look like in a few years.”

Six years later, a team of Dartmouth undergraduates were one of seven winners (out of 350 entries) in a competition sponsored by Google to use Sketch Up to model campuses.

With more than 50 years of experience, a unique culture exists at Dartmouth (and by extension, in the Upper Valley) regarding computing and innovation which makes us uniquely suited for the Google Fiber network. We are prepared and eager to embrace new computing technologies which have the potential for a significant impact on society.

The question is, what are some of the ways Dartmouth might utilize such a network, and in turn find ways to benefit both the Upper Valley and Google as it seeks to understand how a latency-free network might impact the way people work, play, and live?

While Dartmouth remains “one of the most wired places on earth,” much of nearby Vermont and

New Hampshire remain unconnected to high-speed networks. For example, faculty and information technology staff living in the village of Etna three miles from campus have only dial-up or satellite access to the Internet. Rolling topography and low-population density in the 50+ towns of the Upper Valley make it difficult for wireless communications and unattractive to private telecommunications operators. Fairpoint, the incumbent telephone company, recently entered bankruptcy and has an aging copper network and very limited DSL deployment. The cable companies cover only a handful of Upper Valley towns and then only the densest portions of those towns.

Dartmouth faculty are enthusiastic about the possibilities that come with a Google fiber network. David Kotz, professor of computer science and associate dean of the sciences, suggests that such a network would support Dartmouth outreach efforts and collaborations with local schools and museums. It would also foster collaborations with other universities, including those around the world. Fast Internet access is critical to enabling a rich experience, including audio/video conferencing, presentation sharing, and dataset visualization. Given the 'round the clock nature of international collaboration, faculty need fast access where they work *and* where they live.

The Google fiber network would also improve connections between faculty and students. President Emeritus James Wright, who recently retired after a 40-year career on the faculty and as an administrator, noted that the growth of towns beyond Hanover has brought an unexpected change. Faculty, who previously lived adjacent to campus and therefore interacted with students at all hours and in a wide range of settings, increasingly live further from campus. The network would allow faculty and students to meet more regularly and informally, enriching the educational experience.

Because Hanover is two hours by car from the closest major urban area, the Tuck School of Business foresees using video to bring more executives into the classroom as guest lecturers and speakers. Such a network would also permit technology executives to meet in virtual roundtables and develop a research stream on collaboration.

The Thayer School of Engineering is considering a wide variety of applications and uses, including streaming high definition video (possibly including 3-D) from all over the Upper Valley that could be integrated with Google Maps; using maps to build awareness about energy usage and improve energy management at a community level; linking town halls with citizens' homes to foster greater participation in annual town by enabling those unable to attend to participate; and monitoring and controlling laboratory experiments remotely.

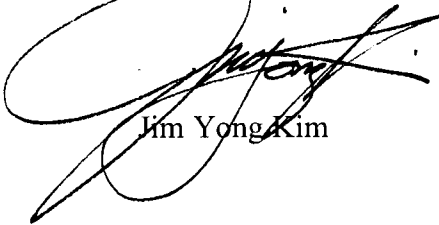
Many faculty at Dartmouth also see the possibility for real-time video-based demonstrations from laboratories into classrooms. Additionally, students and teachers could access visualizations of datasets available on campus, and as more material—from library holdings to scientific data to film and photo and music archives—is available digitally, faculty, students, and even the general public would be able to do more research from home. Finally, in the event of a pandemic or other disruptive campus emergency, faculty could be able to conduct research, meet

with students, and even teach class from home.

Over the coming months and years, Dartmouth and Dartmouth Hitchcock Medical Center (DHMC)—comprised of Mary Hitchcock Memorial Hospital, Dartmouth-Hitchcock Clinic, Dartmouth Medical School and the Veterans Affairs Medical Center—will work closely on a range of initiatives, including the study of effective health care delivery. With a latency-free connection to the Internet, patient portals, remote clinical monitoring of chronic health conditions and many other innovations essential to advancing health care while controlling costs become possible. This in turn could lead to practices scaled for national adoption.

Clearly, there is much that can be accomplished with the Google Fiber for Communities' transformative infrastructure. Dartmouth and the Upper Valley offer a unique proposition: fifty years of experience creating new computing paradigms, and the research, education, and community infrastructure necessary to leverage that experience effectively with the Google Fiber Network. I offer my strongest support to the application of Upper Valley Fiber Initiative, and I appreciate your willingness to give it serious consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Yong Kim", written over a large, stylized, circular flourish.

Jim Yong Kim