Biographical Web Design for Scientific Outreach

Web Biography of a Professor

By Freud Oulon

Biographical Web Design for Scientific Outreach

An Interactive Qualifying Project Submitted to the Faculty of WORCESTER POLYTECHNIC INSTITUTE in partial fulfilment of the requirements for the Degree of Bachelor of Science

By

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Date:

Report Submitted to:

Professor Kaveh Pahlavan

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Contents

Abstract

In this project, research publicity and student outreach are treated as different faces of the same coin and are tackled at once. While doing so, this project makes remarks on some essential aspects of web biography. The project makes a biographical website of one of WPI's laboratories, the Center for Wireless Information and Communication Studies (CWINS), and of its founding director and lead researcher, Prof. Kaveh Pahlavan. The website is both a documentation of the work done at CWINS, a publicity for STEM education among youth, and a web biography.

We first gather the biographical data from interviews, articles, photos, videos, personal narratives, and a previously existing website on the contribution of the laboratory. Then, we proceed to the thematic analysis of the data with the theme of *a well-rounded researcher*. We reconstruct Prof. Kaveh Pahlavan life from a historical approach, centered around a timeline. After that, following the methodology of Joanna Bornat (2008), we make a comparison of the highlights of the historical approach with that of the thematic analysis(pp. 344–356). The first stage of the web design entailed in determining a solid hierarchy for the website design. The design aims to separate the professional and personal growth to portray the various stages of the life and careers development as a professor. Personal life is divided into pre-professional educational era, research and teaching during the professional growth, and formation of family and social activities in late career. The design aims to strike balance on the amount of technical information that is presented. The combination of the web and biographical methodologies reflect the novelty of this project.

1. Introduction

1.1 Background

In almost every single human enterprise, a lot of efforts goes into documentation. The main way in which documentation is used at first is to manage, evaluate, and assure proper allocation of resources. However, over time, documents end up being used as sources for historical recounts and biography.

The Merriam-Webster dictionary defines biography as an account of the life of a person or a thing. One of the first forms of biography, which emphasized the model life set by the subject of the biography, can be traced back to the 2nd century in Ancient Greece (Dukes). It is as if whenever there was greatness, there was biographical documentation.

Biography, which is increasingly common, has been a prominent source of inspiration for several people. Indeed, in a survey made in 2015, 31 percent of surveyed sample claimed

that biography and memoirs were their preferred genre of books (Yucesoy et al. 3). That being said, biography has become diversified in its forms over time. Today, there exists documentaries, biopics, paintings and more recently websites. Given the contextual and therefore evasive nature of biography, scholars have had a difficult time pinning down a comprehensive methodology for it. Consequently, the method used in this paper is an amalgam of several methods to fit the peculiarities of this project.

Our own investigation throughout this project led us to the subsequent conclusions about the nature of biography. Etymologically speaking, biography, the concatenation of Greek "bios" (life) and the Latin "graphia" (Field of study) is the study of a life (Black, 1881). The question of what a biography is, is inseparable from the question of who should be the subjects and authors of a biography. Anyone should proceed to write a biography if they find exceptional qualities in a person or an institution. Consequently, a biography consists in elaborating in a compelling manner the various key processes that lead to the

development of these admired qualities. To proceed to write a biography, it is important to define and keep an audience in mind. Doing so helps prevent verbiage, confusion and highlights most compelling aspects to the audience. In the process of making a biography it is important to draw information from sources to give some credibility to the endeavor. So, part of biography consists in excavating information and presenting it in an attractive and novel way. One way of doing so is to accompany historical accounts with narrative accounts. An element of biography that distinguishes it from a curriculum vitae and from a piece of criticism is that it desperately attempts to recount faithfully the relevant obscure and light aspects of the development of the subject.

1.2 Motivation

The percentage increase of STEM students in the United States is lower than that of several other countries. This is evidence of a failure to get high school students sufficiently engaged in sciences and seeing the prospects of a career and life as a scientist or an engineer. Given the attention-capturing power of the internet of things for younger generations (Anderson, Monica, and Jingjing Jiang 7), some type of social media activity oriented towards the life and prospects of a STEM researcher might be able to help engage more people.

Story-telling is one of the oldest activities that humankind has been engaged in. Information is much most memorable when presented in the form of stories (Jetton 1). This might explain why biographical work is more and more common. The attempt to engage youth through the internet of things might work best if presented primarily in the form of biography. To ensure access and persistence across time and space, the content publicized on social media would need to be organized on a website.

An important aspect of biography which is documentation, has also been one of the main motivations for this project. Having benefited personally from writings regarding the axial revolution and of personalities like Richard Feynman, we realized that it is important for future generations to have ease of access to information concerning some of the major development that are taking place now.

President Barack Obama once said that now is the greatest time to be alive. Indeed, life on earth has improved by almost any measure (Denning). There are many bibliographies that document and recount the discovery and dissemination of the various technologies over the millennia, but a lot of them have been reconstituted retrospectively, after the people in question died. Now that we have the luxury to document event as they happen, and while the main contributors to discoveries are still alive, we should definitely proceed. It is our belief that a vivid recollection of the events concerning development of recent technologies is of interest to youth. One reason for that is that it will require less effort to comprehend the gist of the brilliance of the discovery given that the technology itself is new to them. In addition to that, the reader and the discover are immerse in the same zeitgeist, so there is less effort needed to connect with the document and the experience is therefore more enjoyable. So biographical work is appropriate for this project.

1.3 Project Description

This project broadly entails in making use of the latest form of biography, namely biographical websites, to engage more youth into STEM fields. Various social media platforms are also used to ensure that the project attains its maximal outreach potential. It is also our hope that this paper will be rigorous enough to set a standard for future biographers.

To reach the gross objective of engaging more students into STEM fields, the project will consist in reaching three smaller ones. One of them is to make a web design that is attractive to young audiences

and that will subsist the test of time; the design should be standard enough to not become radically out of touch too soon. Another objective is to organize the content about CWINS so that it is compelling to read. Last, this project intends to recount the role and the personal life of a key researcher in the laboratory. Given the biographical nature of this project, it is paramount to encapsulate the panoramic aspect of personhood, the essence of biography.

Given its substantial accomplishments, involvement of various actors, and breadth of experience, the chosen laboratory is the Center for Wireless Information and Network Studies (CWINS), which has done work on wireless technologies since the early 80's. Prof. Kaveh Pahlavan, professor of Electrical and Computer Engineering and Computer Science at WPI, will be the subject of the biography. He is the founder of CWINS and has been having a diversified life and therefore constitutes a good subject to reach the objectives of this project.

1.4 Report Structure

In the following pages, we first proceed to show the details that led to the formulation of the topic of this project in the Background and Literature Review section. Then, we discuss the methodology followed for the biographical aspect of the website and make general remarks on biographical websites. After that, we present the results of the project, the final design of the biographical website. In the result section, we explain the different decisions taken in the design of the website. Finally, we close this paper with a synthesis of the results of the project with a possibility of extension.

2. Background and Literature Review

Several realizations ignited interest for the topic of this project. One of them is the realization that the despite all appearances, there are few young Americans enrolled in university for completion of a degree in stem field. For example, there are almost as many new engineers in China (McCarthy) as there already existing engineers in the US (Sargent Jr. 2). Also, during previous work for a conference, we heard of a WPI laboratory that made significant contributions to WIFI technology. Furthermore, there is this idea among lay people that technical fields are for cold-minded, fact-driven, emotion-deprived loners who tend to engage only in intellectual activities. In consideration for our IQP, these various bits of facts click together and lead us to orient towards biographical work. The issues addressed in this project are how to attract more people into STEM fields, how to best document the work of the productive laboratory and redress the perspective of people in STEM fields.

Is the comparison between the number of engineers in the US and China appropriate? Is the difference in numbers in the US and other countries caused by differences in interest or by differences in the effectiveness of the high school system? These questions are being asked to know whether there is an issue that this project is capable of helping resolve. Taking into account differences of population size and differences in constituents of stem fields, no, the comparison between China and the US is not a good one. However, a comparison between the US percentage of university graduates and that of Germany and India confirms that the STEM fields in the US are under numbered. In 2018, while 35% and 32% of university graduates in Germany and India respectively were from STEM fields, only 18% of graduates in the US were STEM graduates. While one could speculate that such difference arises from lesser interest for STEM fields by US high school students, we would like to make the case that it is rather a failure of the education system and a lack of seduction of universities that is the root of the issue. The failure of high school hypothesis is a lot more understandable as a potential explanation for attraction in the first place.

But there is also the problem of retention. Indeed, a lot of first year STEM students end up switching majors after their first semester or year ("*S&E Retention Rate*"). To us that seems to be a failure of the universities to present a broader perspective on the student's area of study while there are being taught the rudiments of their field. Indeed, courses are very often taught without presenting any seeming correlation with one another and students lose sight of the gestalt of their major. So, it is our hope that this project attempt to depict the work done at one of the successful research laboratories will help create this sense of interconnectivity and remind students of the role that the various aspects of personhood play in research.

Biography is to psychology what the oral tradition is to history. They both vitalize their counterparts and enable us to see the relationship between entities such as the relationship between the individual and institutions and institutions and nations. Although biography and oral traditions have a strong subjective element, they both offer something that many disciplines are trying to get rid of: the opinion of another human being to another human being, which is an intrinsic part of life. The informative aspect of biography is one of the reasons it is now playing a compensatory role in the social sciences . Given the topic of this paper, here are some relevant questions that will help follow the rest of this paper:

What is the individual to an institution? What is an institution to an individual?

The individual is the pillar on which institutions stand. As with edifices, a single pillar cannot make an institution stand but a set of pillars do. However, the fall of a single pillar can lead to the fall of the entire edifice. The collaboration of individuals makes institution function. The failure of a single one of them can lead to the ruin of the institution, and the perfection of the individual can uplift institutions.

Pillars stand together because they are under the umbrella provided by the edifice. The collaboration of individuals is only possible because of the protection of institutions. Individuals makes institutions and institutions make individuals. For this reason, a proper biography of an institution requires that of the

individuals that partook to its life, and the biography of the individual requires that of the institution that helped them growth. They are inseparable.

What is the state of biography of laboratories?

Most laboratories have pages to attract grants and researchers, but we have not found any website about the cycle of laboratory research, a laboratories' biography. A laboratory biographical website would be different from a laboratory grant website in many ways. A biographical website should focus on research eras, present some of the results and stakes in a compelling but not inflationary fashion. There should be some description of events, and specialized jargon should be avoided whenever possible. In the greater scheme of things, it should be showing the strengths and limitations of the scientific method and the scaffoldings of researchers.

3. Methodology

The methodology is the following. First, we gathered the biographical data from interviews, articles, and personal narratives and a previously existing website on the laboratory. Then, we proceeded to the thematic analysis of the data with the theme of *a well-rounded researcher*. we reconstructed Prof. Kaveh Pahlavan life from a historical approach, centered around a timeline. After that, following the methodology of Joanna Bornat (2008), we made a comparison of the highlights of the historical approach with that of the thematic analysis.

Throughout the biographical work, the importance accorded to the biographical sources follows this order: Newspapers, interviews and written personal narratives. Interviews were used as a determinant of the importance of the various events. We did not do any interviews ourselves and instead used the ones that were done long ago for other circumstances.

A lot of the resources for this project come from a previously built website that had for objective to attract grants and PhD students. The website built for this project makes use of older content to present CWINS from an historical standpoint with the objective of documenting CWINS evolution and shed light on the life of its key actor.

The biographer became closer to Persian culture, the native culture of the subject of the biography, by reading, listening, and watching content related to the celebrated Persian poet Rumi. This was helpful since Prof. Kaveh Pahlavan has a broad approach to life and is fond of Rumi's writings and often brings them up in technical talks, as several of his students can attest.

The website structure was established using a class diagram. The goal was to prevent redundancy, and to achieve clarity. Given that the targeted audience is presumed lay, a lot of work has gone into filtering

technical information. After the establishment of the first diagram, we proceeded to build the first pages to test the quality of the design.

The website is organized to facilitate the encounter of the various elements of the biography. Analogous to a book's table of content, the menu presents the skeleton of the website. One of the differences though is that website visitors continually interact with the menu. So, menu structure is essential for a good web biography. All pages are presented on the menu as a menu item. Having some pages that are not present on the menu is usually sign of an incoherent organization, which as you can imagine can interfere with rendering the biography. The name given to menu titles attempts to encapsulate the content of the pages they represent. Symmetry in nomenclature has been considered for submenu items.

As to web design, although it is an open terrain, it is important to fit the demands of the biography. In this project, we chose a minimalistic style and hamburger menu to facilitate the processing of research-related activities and a darker them to depict the historicity of the life of the subject. Pages were designed with the same pattern to enable visitors to focus on the content.

Criteria for biography of a living person

CWINS laboratory and professor Kaveh Pahlavan are still publishing papers, collaborating with other entities. For this project a lot of resources were gathered from communication with Professor Pahlavan. One of the advantages of the biography of the living is that information can be gathered directly from the source and some mischaracterization avoided. However, obvious conflict of interest arises and lead to other sorts of mischaracterization. For this project, some measures were taken to limit them. Although the sources were provided by Professor Pahlavan himself, the biographer had the last word on what ended up in the project portfolio. Furthermore, we met with Dr. Abbas Milani from Stanford University, expert in history and biography who provided guidelines on rendering an honest yet exhilarating biography.

Standards in web design

The first stage of the web design entailed in determining a solid hierarchy for the website. The design aims to portray the various stages of CWINs in a coherent and attractive fashion. The design aims to strike balance on the amount of technical information that is presented. There needs to be enough details so that the description and documentation is holistic while limited such that the non-pundit audience is not overwhelmed with irrelevant information.

The color theme is a mix of tamed gold and dark grey. Tamed gold is used on the home page and the pages related to the biography of CWINS. Tamed gold was the chosen main color because it matches well some of the colors in the pictures on the home page. Also, gold is valued because it cannot be reproduced. So does any valuable work and product. We think this aligns well with the pioneering work done at CWINS.

A gradient dark grey is prominent on the personal life page. It was chosen to match the black and white videos populating that page. The gradient was added because that page is a timeline and shows different stages of the life of Prof. Kaveh Pahlavan and his family.

4. Results and Discussions

4.1 Menu and Website Organization

The menu is a hamburger menu. It was chosen because it provides a slick minimalistic look to the website, which is important because the audience is already overwhelmed with more technical information than they would normalize encounter on most websites. The default color on the menu items is black because it is easier to read on the default background which is white.

Every page that exists is represented by a menu item. So, the menu is reflective of the website structure.

4.2 Submenu Items

The website menu, depicted in fig. 1, is such that the webpages are organized in two submenus: the professional life (CWINS page) and personal life. CWINS is documented under 3 main submenu categories, which are timeline, research, and education. CWINS is presented in this format so that the content is easily digestible. The timeline page is the first under CWINS since it underlines the importance of the work done at CWINS and gives clear chronology of the events and activities CWINS partook in. The research submenu exists because a laboratory identity is centered around the research that it produces. CWINS, despite having produced a lot of research has also generated a lot of educational content. Indeed, Professor Pahlavan, one of the main actors at CWINS has been teaching several graduate and undergraduate electrical engineering courses at WPI. A lot of the courses are accompanied with textbooks that he wrote in conjunction with colleagues. The textbooks are culmination of CWINS research epochs. So, the education submenu item enables curious minds to access courses and textbooks related to CWINS.
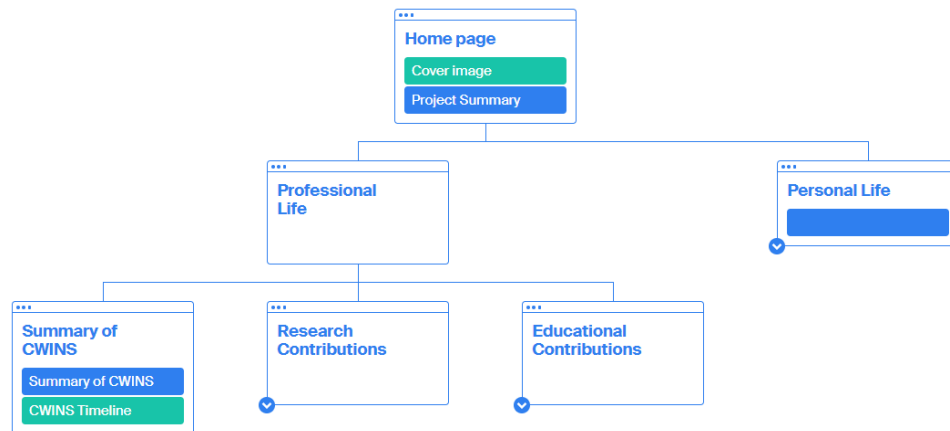
Figure 1

Research Submenu

Since CWINS has mainly done research on three areas, it follows naturally that the research submenu item is further divided in three sub submenu items which correspond to these three areas—Wireless Lan, Body Area Network, Indoor Geolocation, and RF Cloud. Each of these sub submenu items will contain publications, photos and recount of events and interviews related to the matching research area. Publications are displayed because this project is also trying to document CWINS. In addition to that, some of the papers published gives a comprehensive summary of the work produced on the given area. But given the technical nature of the papers written, only major publications are displayed. Since several events were organized around these research areas, there were included. Events were included in the research sub submenu items to portray the solemnity of the work done at CWINS.

The name of the various actors on the various projects are mentioned in a tab at the bottom of each research area page. The purpose is to give proper due credit to the various actors and to emphasize the collaborative nature of research.
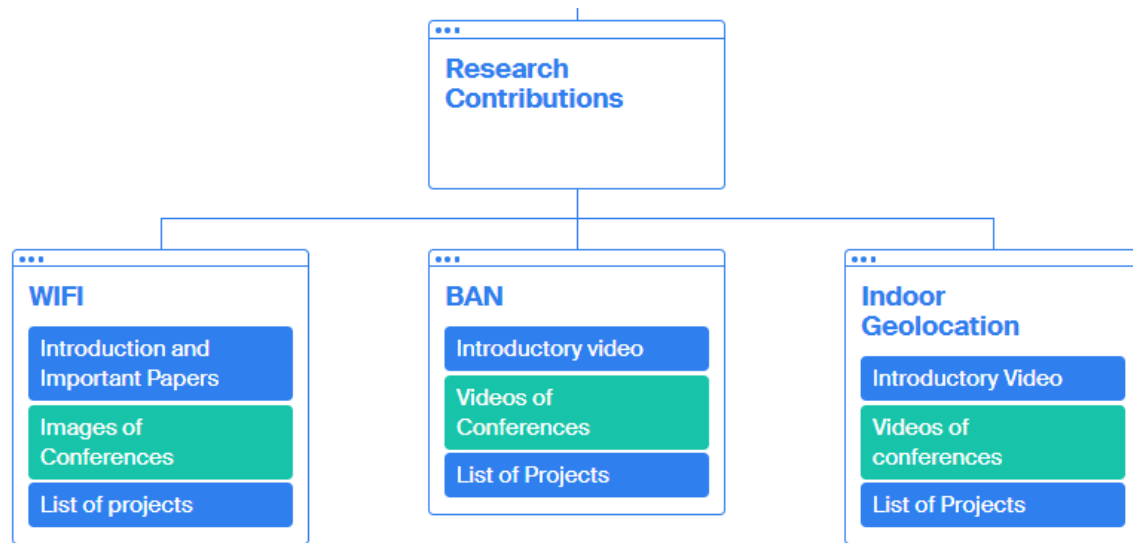
Figure 3

Education Submenu

The education submenu is subdivided into Academic Offsprings, Textbooks and Courses. Given the large

number of students that have been involved with CWINS and the prestigious route that these students

have taken after their involvement at CWINS, a big piece of CWINS and of Pahlavan would have been

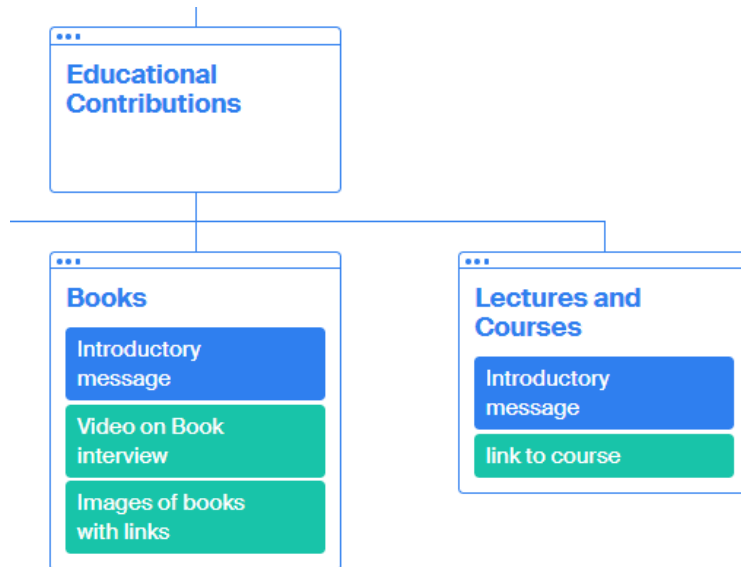missing if students were not incorporated into this biographical website.

Figure 4

4.3 Pages

Homepage

The home page is the landing page of the website. It has a slider of images, meditations on biography, and a short text biography of Prof. Kaveh Pahlavan. The set of images is to retain the website visitor after their first glance at the website. But also, the choice of images is such that they get the theme of the website: the biography of a CWINS and of its founder, Prof. Kaveh Pahlavan. The images have a piece of text overlayed on top. To no overwhelm the visitors, only one quote was kept for all the images on the slider. The quote chosen is that of the celebrated Persian poet Rumi. This quote ("I was raw, I cooked then I burned") encapsulates aspects of the life of Prof. Kaveh Pahlavan. The text biography following the image slider, presents keep aspects of this project.

Web Biography of a Professor

This website is part of a project completed by Freud Oulon as part of a 2022 Interactive Qualifying Project at the Worcester Polytechnic Institute (WPI). The explicit purpose of the project is to build a website to attract youth in the STEM fields while disseminating the work done at the Center for Wireless Information Network Studies (CWINS), WPI. The implicit purpose is to learn the process of making a web biography, as opposed to a traditional written biography; a web biography narrates a story through multimedia content while a written biography emphasizes a verbal narrative. The difference between a web biography and an ordinary website is that a web biography narrates a story into pages replacing chapters of a biography book. In the design of the biography website we have grouped pages (chapters) into three headlines (parts). The introductory part provides a timeline page like an introduction chapter to introduce the subject of the biography, the second part or headline consists of two sub headlines describing research and teaching contributions, the last headline or part describes personal life matters consisting of a family album, art and travel, and sports pages. The subject of the biography is Kaveh Pahalvan, a professor of ECE/CS and the founder of CWINS, established in 1985 as the first academic research laboratory in wireless local area networks, commercially known as Wi-Fi. The project report, which contains the rationale for the various design decisions and general remarks on the demands of web biography, is attached below.

On Biography

In almost every single human enterprise, a lot of effort goes into documentation. The main way in which documentation is used at first is to manage, evaluate, publicize, and assure proper allocation of resources. However, over time, documents produced end up being used as sources for historical recounts and biography.

The Merriam-Webster dictionary defines biography as an account of the life of a person or an entity. One of the first forms of biography, which emphasized the model life set by the subject of the biography, can be traced back to the 2nd century in Ancient Greece (Dukes). It is as if whenever there was greatness, there was biographical documentation.

Biography, which is increasingly common, has been a prominent source of inspiration for several people. Indeed, in a survey made in 2015, 31 percent of the surveyed sample claimed that biography and memoirs were their preferred genre of books (Yucesoy et al. 3). That being said, biography has become diversified in its forms over time. Today, there exists documentaries, biopics, paintings, and more recently websites. Given the contextual and therefore evasive nature of biography, scholars have had a difficult time pinning down a comprehensive methodology for it.

My own investigation throughout this project led me to the subsequent conclusions about the nature of biography. Etymologically speaking, biography, the concatenation of Greek "bios" (life) and the Latin "graphia" (Field of study) is the study of life (Black, 1881). The question of what a biography is is inseparable from the question of who should be the subjects and authors of a biography. Anyone should proceed to write a biography if they find exceptional qualities in a person or an institution. Consequently, a biography consists in elaborating in a compelling manner the various key processes that lead to the development of these admired qualities. To proceed to write a biography, it is important to define and keep an audience in mind. Doing so helps prevent verbiage, confusion, and highlights the most compelling aspects to the audience. In the process of making a biography, it is important to draw information from sources to give some credibility to the endeavor. So, part of making a biography consists in excavating information and presenting it in an attractive and novel way. One way of doing so is to accompany historical accounts with narrative accounts. An element of biography that distinguishes it from a curriculum vitae and from a piece of criticism is that it desperately attempts to recount faithfully the relevant obscure and light aspects of the development of the subject.

In the effort to find compelling aspects to portray a person or an institution, it is important to do so with respect to some standards. For example, in the case of my project, I was trying to portray the life of a professor, so I referred to indicators such as the subjects' number of citations, and h-index of published papers and textbooks, and the number and prestige of awards won. Those indicators themselves do not mean very much except in comparison to the indicators associated with the work of other people that are in the same field. As to the quality of life, I considered the depth and breadth of activities that the subject engaged in and the depth and breadth of social circles. Although it is more difficult to portray quality of life, it is often standard to consider an amalgam of time investment, variety, rewards, and meaning associated with the activities the subject engaged in during their lifetime.

Summary of CWINS

The first part of this page contains a written summary of the first stages of CWINS. In the second part the summary is enriched by a vertical timeline. In the timeline, the life of CWINS is presented in a chronological order. Major events such as the first IEEE conference on WLAN are displayed on the sides of a vertical line with the corresponding date on the other side. The event is caricatured with an image and a little description right below. Yellow was the color of choice for the calendar icon to fit with the website color scheme. The line along which everything is organized is of color dark blue once again to fit the rest of the website.

Figure 2
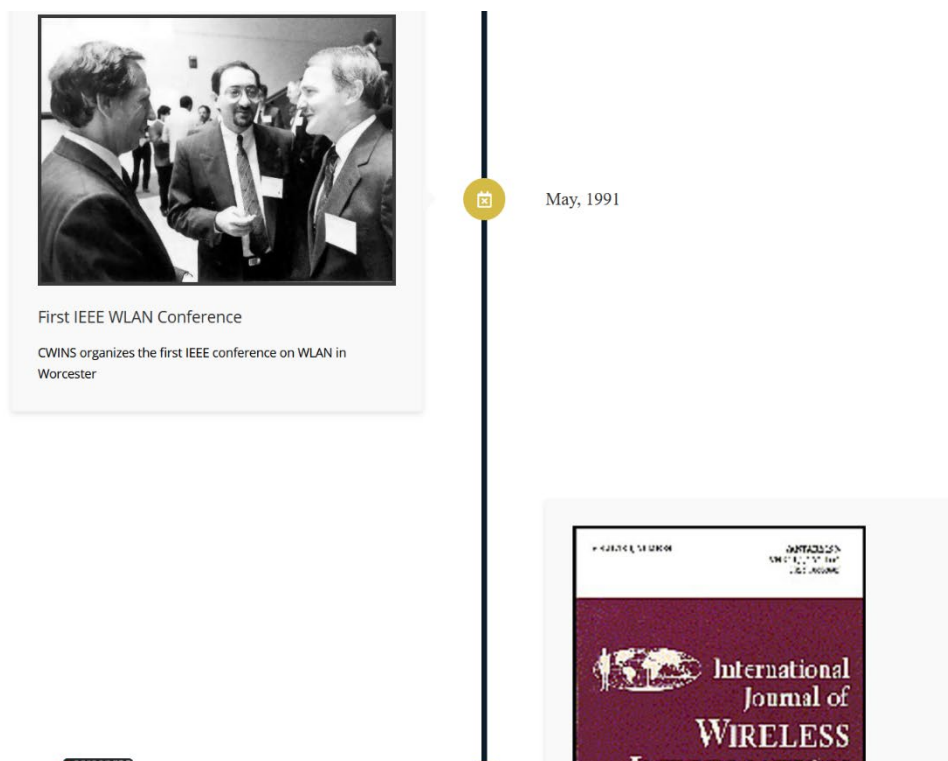
WIFI page

The WIFI page has three main sections. The first one hones on the synthesis of the research done on WIFI at CWINS. This is achieved by juxtaposing the very first published paper by CWINS on WIFI and another paper that offer a holistic perspective on the evolution and impact of WIFI now that the area has been significantly explored. A piece of text has been inserted in between the two papers to help the reader piece it together. Furthermore, for people intimated by the technicality of the papers, this piece of text mentions the relevance of the papers in colloquial terms. These two papers were chosen because they

represent keystones of CWINS. The publication of the first paper (uncreatively dubbed "Alpha" on this website) marked the beginning of CWINS and the beginning of the WIFI research era. It is this paper that disseminated the various brainstormed techniques for WIFI, each later adopted by industry actors.

In the second sections three pictures of the first three IEEE conference on WIFI are displayed (FIG). The people in the pictures are identified by a description placed underneath the images. Each picture is linked to the corresponding and previously built conference webpage which curious visitors can access by clicking on the images. The pictures are significant because CWINS was the major actor in the organization of the first IEEE conference on WIFI and was significantly involved in the following others.

IEEE Wireless Workshops

Third IEEE Workshop on Wireless LANs

From left to right: Kaveh Pahlavan, Workshop Chairman, Edson de Castro, Keynote Speaker, and Allen Levesque, Publicity Chair

Second IEEE Workshop on Wireless LANs

From left to right: Brian King, President of Proxim, Todd Smith, President of Aironet, Bruce Tuch, designer of WaveLAN, Paul Odlyzko, Chief Radio Architect, Motorola Radio Research Lab Craig Mathias, Principal of Farpoint, Kaveh Pahlavan, Workshop Chairman

First IEEE Workshop on Wireless LANs

From right to left: Charlie Bass, Cofounder of Ungermann-Bass, Kaveh Pahlavan, Workshop Chairman, and Phil Bello, pioneer of Statistical Radio Channel Modeling

The third section presents all the major projects undertaken by CWINS in the subsequent years of the establishment of the WIFI era. There are organized in toggles to not overwhelm the reader. Opening any of these toggles will enable the page visitor to read the objectives and the names of the participants of the corresponding project. Clicking on a toggle content opens it, displaying with more detailed information about the project in question.

Major Projects

Innovative Indoor Geolocation Using RF Multipath Diversity (DARPA)	⊕
Innovative Methods for Geolocation and Communication with UWB Mobile Radio Networks (DARPA)	⊕
Indoor Geolocation Science for 4G Wireless Networks (NSF)	⊕
Real-Time Channel Simulation for Telecommunication and Geolocation Applications (DoD DURIP)	⊕
Urban Geolocation System Analysis and Demonstrator (TASC-Litone/DARPA)	⊕
Wireless Indoor Geolocation and Voice Over IPV6 - WINGIP (U of Oulu/TEKES, Nokia, Finnish Airforce)	⊕

BAN page and Indoor Geolocation page

The first section contains a video in which Prof. Kaveh Pahlavan and one of his students (at the time) introduce their research on Body Area Networks. It was chosen because of its introductory nature and because it is lighter to process than the introductory papers chosen for the WIFI section.

The second section contains three videos of keynote speakers at previous conferences on the topic. The videos are about the applications of Body Area Networks and the application of research is one of its most attractive aspects, so it seemed natural to us to add it in this section.

The third section of this page contains details about projects on Body Area Networks like the third section of the WIFI page contains the details about projects on WIFI. The structure is similar.

5. Conclusion and Future Directions

This project consisted in making a biographical website about CWINS and its lead researcher to attract youth by advertising research achievements. The website has a professional and a personal component. The professional component, which is preceded by a chronology of the life of the subject, was further categorized into introduction, research eras, courses, and textbooks. The personal component was divided into family, art, and sports. Most information was gathered from newspaper articles and preexisting laboratory website and communication with Professor Pahlavan. A continuation of the project could consist in conducting interviews and building social media platforms.

References

Anderson, Monica, and Jingjing Jiang. "Teens, Social Media & Technology 2018." *Pew*

Research Center: Internet, Science & Tech, Pew Research Center, 27 May 2021,

https://www.pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/.

Dukes, Jessica. "What Is a Biography?" *Celadon Books*, 20 Dec. 2020,

https://celadonbooks.com/what-is-a-biography/.

Bornat, Joanna. "Biographical Methods." *The SAGE Handbook of Social Research Methods*, Jan.

2008, pp. 344–356., https://doi.org/10.4135/9781446212165.n20.

Denning, Steve. "Why the World Is Getting Better and Why Hardly Anyone Knows It." *Forbes*,

Forbes Magazine, 30 June 2021,

https://www.forbes.com/sites/stevedenning/2017/11/30/why-the-world-is-getting-better-

why-hardly-anyone-knows-it/?sh=4762082c7826.

Jetton, Tamara L. "Information-Driven Versus Story-Driven: What Children Remember When

They Are Read Informational Stories." *Taylor & Francis*, 2006,

https://www.tandfonline.com/doi/abs/10.1080/0270271940150203.

McCarthy, Niall. "The Countries with the Most STEM Graduates [Infographic]." *Forbes*, Forbes

Magazine, 30 June 2021, https://www.forbes.com/sites/niallmccarthy/2017/02/02/the-

countries-with-the-most-stem-graduates-infographic/?sh=781211e5268a.

Sargent Jr., John F. "The U.S. Science and Engineering Workforce: Recent, Current, and

    Projected Employment, Wages, and Unemployment." *Project On Government Secracy*, 2

    Nov. 2017, https://sgp.fas.org/crs/misc/R43061.pdf. V

Watson, Amy. "Topic: Book Industry." *Statista*, Statista, 10 Sept. 2021,

    https://www.statista.com/topics/1177/book-market/.

"What Is the S&E Retention Rate in U.S. 4-Year Institutions?" *STEM Education Data and*

    Trends, National Science Foundation, https://www.nsf.gov/nsb/sei/edTool/data/college-

    10.html.

Yucesoy, Burcu, et al. "Success in Books: A Big Data Approach to Bestsellers." *EPJ Data*

    Science, vol. 7, no. 1, 2018, https://doi.org/10.1140/epjds/s13688-018-0135-y.