

## **Advanced Software Engineering Students – Golden Fire Department Needs YOU!**

### **BACKGROUND**

The nine square miles of the City of Golden is located at the west edge of the 774 square miles of Jefferson County. Golden is the western most suburb in the Denver Metro area. Rolling grassland, natural foothills, rugged mountains and rivers are unique to the topography that surrounds Golden. The City of Golden is a home rule municipality comprised of various city departments including the Fire Department. The City of Golden is home to the Coors Brewing Company, the Colorado School of Mines, the Jefferson County Detention Facility, the Jefferson County Sheriff's Department and is the county seat for all County Government offices. Golden's resident population is more than 20,000, which increases to approximately 50,000 Monday through Friday between the hours of 8:00 AM and 5:00 PM. Approximately 5000 students, age 2-18 attend our schools and another 5500 attend college courses in pursuit of degrees at the Colorado School of Mines campus.

The Golden Fire Department is a combination department made up of volunteer and career firefighters. We currently have 87 volunteer firefighters and 12 career administrative staff. The administrative services staff consists of a career Fire Chief, Training and Operations Captains, Fire Marshal, Fire Inspector, Administrative Assistant, Media Supervisor (volunteer), Media Services Technician and a Fire Mechanic. The Golden Fire Department currently has one part-time positions, which include a Fire Academy Coordinator. Staff personnel including the Fire Chief, Training and Operations Captains, Fire Marshal and Fire Inspector also have emergency response responsibilities. The Golden Fire Department provides structural firefighting, basic life support services, heavy rescue, high angle rescue, low angle rescue, swift water rescue, ice rescue, wildland firefighting, hazardous materials response, fire prevention services, inspections and public education for our residents and visitors. The department provides fire protection to the Coors Brewing Company and emergency response to the unprotected areas of unincorporated Jefferson County adjacent to Golden.

For the last 139 years Golden Firefighters have been on the job. Outside of a small career staff of full-time City employees, 100% of the operational forces are volunteer

firefighters. These firefighters participate in countless hours of training, emergency responses and work details. The volunteer firefighters are held to the same high standards as all of the state's career firefighters and possess the necessary skills and certifications required in the profession.

## PROBLEM STATEMENT

For our customers and businesses in Golden, ranging from the very small to the big box store to college campus to suburban corporate facilities, the availability of an adequate number of firefighters to respond in an emergency is being taxed as never before. Over the past several years, the City of Golden has witnessed a dramatic increase in the number of emergency responses. That number steadily climbed to 2287 in 2018 from 1573 in 2017. The year of 2019 has seen a return to above 100 responses per month through April, with an increasing need in mutual aid requests from neighboring departments. During the same period a decrease in the average number of volunteer firefighters responding to each call has occurred. Total strength of volunteer personnel has declined steadily over the years. This is due to retirements and various personnel moving out of the area due to the extreme high cost of housing in the City of Golden. The problem is an increase in call volume and a decrease in volunteer firefighters, which has diminished the department's ability to dispatch a safe number of personnel to each emergency incident we are called to.

Changing work patterns for volunteer firefighters coupled with greater training requirements for firefighters has increased the time commitment for our personnel. While Golden bolsters one of the top volunteer agencies within the State of Colorado, recruiting of additional volunteers is difficult at best due to the time and training commitment needed to maintain our high standards and level of service.

The majority of volunteer firefighters who serve the City of Golden are employed during the hours of 6:00 AM until 6:00 PM, which is typical of the work habits of the American public. This creates a staffing shortage during these hours while the city experiences a substantial increase in population during the weekday period. Overall the department averages 3.5 personnel per call. This number is drastically reduced to 1.5 or less during weekday hours. Career staff members including the Fire Chief, Training and Operations

Captains, Fire Marshal and Fire Inspector are then shifted into field operations when staffing is not augmented by the volunteers. The emergency response from the administrative staff removes them from their primary responsibilities and decreases the efficiency of our administrative operation.

Another major factor in emergency response is the time of day and day of the week in which the majority of calls occur. Fifty percent of the total calls occur between the hours of 6:00 AM and 6:00 PM, Monday through Friday. This reflects that half of our call volume occurs when the fewest number of volunteers are available to respond. The Golden Fire Department management team believes they are severely understaffed. In order to prove this hypothesis, a regular and critical analysis of response data needs to be conducted. Further, a system of data collection, analysis and reporting needs to be created.

#### WORK TO BE DONE

With the aid of the Colorado School of Mines CS Capstone team, we expect to build a performance management system to help us gather and analyze data in order to produce solutions within the Department. The system should be designed to assist us in quantifying and evaluating our performance.

#### DESIRED SKILL SET

We believe students with software engineering background and education will be able to build a performance management system. An assessment of the existing computer programs/systems that GFD uses to collect and process data will be necessary. Systems we currently use are called Emergency Reporting, When 2 Work, I am Responding, in addition to data entry into the National Fire Incident Reporting System (NFIRS). Developing a process for pulling data from these systems on a regular basis will be needed. Determining a process for analyzing and reporting the data will be needed. From this the development of a computer program, application performance management system should be built.

## TEAM MAKE-UP AND PERKS

The preferred size of the team is flexible, from 3 to 5 students would be manageable. There is a possibility for an unpaid internship following the project, but definite opportunities for letters of recommendation, engagement with positive role models, real world work experience and mentorship will be provided.

## JOB LOCATION

The Golden Fire Department is within blocks of CSM Campus. We are located at 911 10<sup>th</sup> Street cross of Washington Ave.; some work could be performed on location, and other work could be done remotely based on student needs.

We realize the CSM students have a choice in projects they select. However, the performance management system they create for the Golden Fire Department will have the potential to save lives, while causing GFD to work more efficiently and effectively in their pursuit of excellent customer service. The department is made up of an amazingly diverse group of people, from career firefighters, to engineers, Miller Coors employees, and even several CSM graduates. We are a fun and talented group, seeking help from fun and talented students. Please contact Fire Chief Alicia Welch at [awelch@cityofgolden.net](mailto:awelch@cityofgolden.net).