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## MScA Capstone Problem Statement

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| Company Background/Description/Profile |

The University of Chicago’s Polsky Center for Entrepreneurship and Innovation’s Science and Technology team creates and manages the intellectual property arising from University early-stage research and creates partnerships with companies (through licensing) to develop the intellectual property into products. University of Chicago inventions have been transformed into a number of products on or near the market, in fields ranging from healthcare to manufacturing to energy production.

Over the past thirty years, the office has filed over 6,000 US and foreign patents based on a subset of over 3,500 submitted invention disclosures. A minority of those patents have been licensed to companies, through over 250 license agreements.

The patenting and licensing processes both play out over several years, during which the University invests ~$3M/year in external legal expenses. Companies licensing the intellectual property reimburse the University for a significant fraction of those costs, with some of that reimbursement being for recently incurred costs and some of it being for costs incurred several years earlier. In addition, the University receives royalties on sales of marketed products, which may come in several years after the intellectual property is licensed. Over the last five years, the University has received over $40M in cumulative license revenue. These funds are divided between the inventors, research support, and covering the expenses of the Polsky Center.

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| Project Title |

Analysis of UChicago Patenting and Licensing Data

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| Business Problem/Opportunity Statement |

The University invests in patenting early stage research with incomplete information about its commercial prospects. In addition, the patenting process itself is slow, expensive and uncertain. A detailed analysis of the University’s patent and licensing data should yield insights on key decision points and suggest opportunities for improvements in the Polsky Center’s processes.

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| Data Description |

Data on the University’s patents and license agreements are stored in a database provided by Inteum Company, LLC. The product is designed for academic technology commercialization organizations. The database contains metadata, original documents (e.g., pdfs of patent applications), financial data, and some associated correspondence. Much of the data describes the decisions made during the process of getting a patent allowed, which typically takes three to five years and involves extensive correspondence with US and foreign patent offices, carried out through external patent attorneys.

Some additional data exists in separate locations.

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| Expected results (Deliverables, Outputs) from Student Data Science team(s) |

Observations and recommendations for ways to improve our processes, which could include some of the items listed below. It is expected that the scope of the project will be adjusted once the student team has seen the data.

* Are there any characteristics of a technology or a patent that are correlated with the likelihood that a patent gets licensed to a company during its lifetime? Are there detectable signals indicating when the office should cut its losses on a given patent? The variables that could be explored include characteristics of the inventors (e.g., field of research, amount of research funding, paper citation rates, etc.), the external law firms and attorneys used, or characteristics of the patent application itself.
* For a variety of reasons, the office may abandon a particular unlicensed patent before it expires, to save time and money. Are there any characteristics that are correlated with the likelihood that a patent is abandoned before it gets licensed to a company or expires? If so, these could be signals to not invest in a patent in the first place.
* Are there any major differences between the different external patent firms/attorneys the University uses? These could include:
  + the time it takes for the Patent Office to issue a patent,
  + the differences between the patent application the office *hoped* to get granted by the Patent Office and what was *actually* granted (this would require some analysis of the actual text),
  + the percentage of patents filed by the firm that were eventually abandoned without being licensed,
  + the cost of getting a patent allowed by the US Patent Office, and comparisons to the costs in other countries.
* Are there different ways to organize and/or label our data to facilitate, for example:
  + Readily knowing which University patents, and associated incoming legal bills, are being reimbursed by a licensing company.
* Are there any major differences, in licensing outcome or patenting expense, by inventor, department or field of research?
* What are the chances a University patent gets licensed to a company? How does that probability change with time? Similarly, what is the typical profile over time of the finances associated with a patent? That is, how much is spent on average and what is the variability? When a patent gets licensed what is the average time (and variability) before patent costs are reimbursed by a company, and the average time before any royalties are received?
* How does the chance a patent gets licensed depend on how many other patents are in the same patent “family”? How does the probability depend on what stage the patent is at in the patent application process?

**Note that a tutorial on the basics of the patenting process will be provided to the team.**

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| Company Point of Contact |

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*Capstone project descriptions may be used on program websites or in other materials. If you do not want your project included, please opt out by clicking the check box* ***(For discussion – an edited version should be fine.)***