Putting your work in context:

Writing Introductions to Reports and Technical Papers

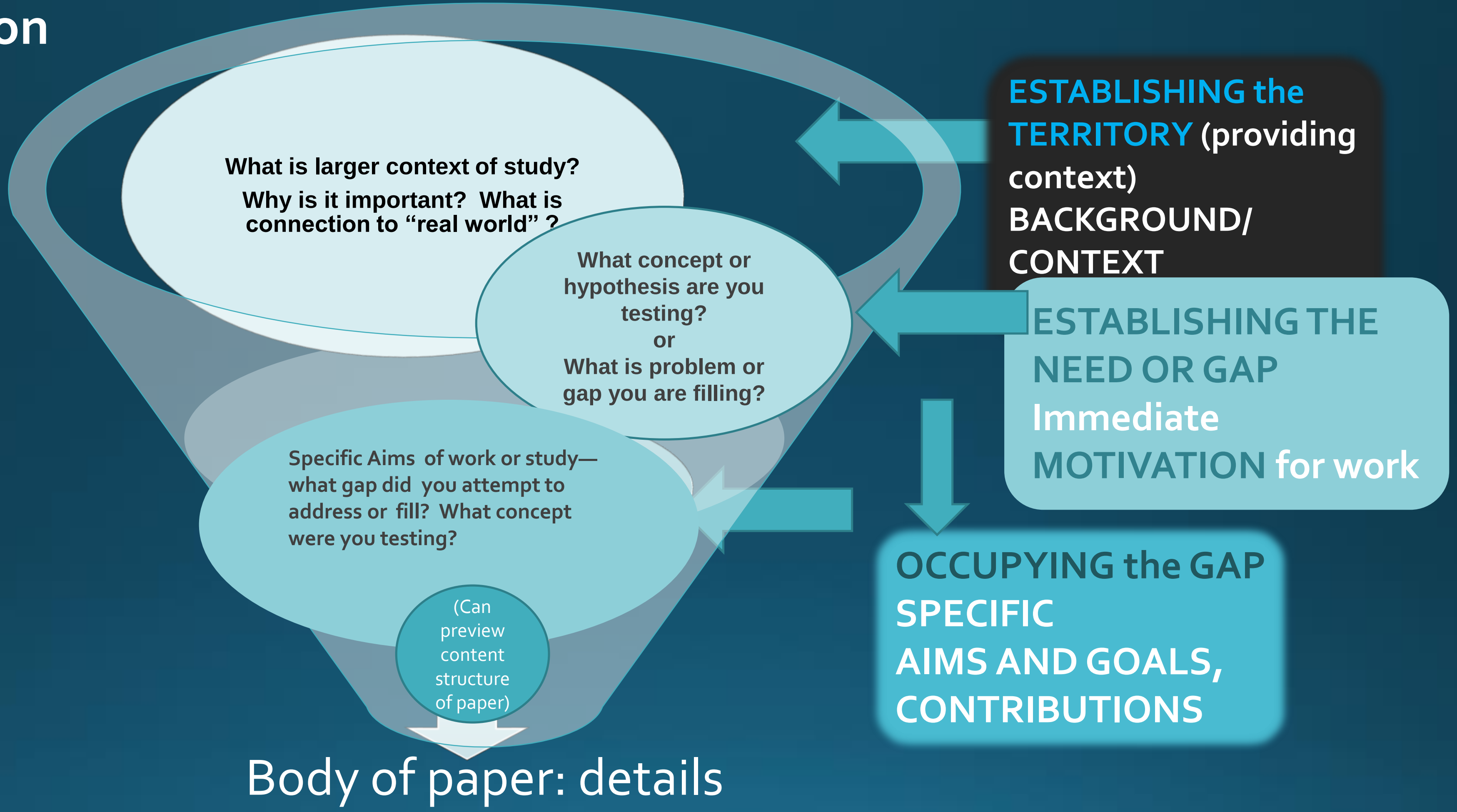
TCP, Stanford SoE

The introduction: *the all-important set up*

- Provides the context of the work, or establishes the "territory"
- Establishes the need for work or "gap"
- Establishes how you addressed this need or attempted to fill the gap through your work, establishing your contribution

In technical reports and documentation, you do not want to leap right into a discussion without any contextualization or set up!

The FUNNEL introduction



A simple example

Finding the resonances of X is important for tuning Y. The goal of this lab was to identify the resonance of X at which Y puts out maximum power.

Another simple example

Xs are increasingly important for many commercial applications, such as cell phones, GPS devices, and medical devices. **(ESTABLISHING TERRITORY/CONTEXT)** However, the cost of encasing Xs is still high.**(NEED/GAP)** In this work, our aim was to design a new method of encasing X. **(ADDRESSING THE GAP/SPECIFIC GOAL)**

Sample

One of the most common uses for the emerging small unmanned aircraft market is video capture. Technology advances in small high-bandwidth antennas has allowed for simpler first person video (FPV) flying, where the pilot "flies" the small aircraft as if he or she were in the cockpit. **(ESTABLISHING TERRITORY/CONTEXT)** However, while the video obtained can be very useful, the accompanying audio is often useless due to several sources of background noise that overpower any desired audio sources. In one kind of unmanned aircraft , quadcopters, most of this noise comes from the motors and the propellers. **(NEED OR GAP)** In this project, our main goal was to characterize and digitally filter this noise to enhance FPV use. (**ADDRESSING THE GAP/AIM OF WORK)**

Some more examples of the "funnel" intro

Speech recognition continues to be a major area of research and to have commercial importance. With the rise of mobile applications and the Internet of Things (IoT), the need for fast and energy-efficient speech recognition algorithms will only grow in the coming decades. **(Establishing territory and need/gap)** To address this need, in this work, we implemented a pre-processing front-end speech dependent key word recognizer on a combined c55 DSP/Matlab platform. The DSP platform extracts the periodogram in real-time. The periodogram is used to compute the mel-frequency cepstrum coefficients (mfcc) [1][2], which are then used as input features to a machine learning classifier implemented in Matlab. **(Addressing the need)**

Another, more complex, example

Recent advances in hardware development [1]–[5] have enabled radios to transmit and receive on the same frequency at the same time, with the potential of doubling the spectral efficiency. Referred to as Full Duplex (FD), these systems are emerging as an attractive solution to the shortage of spectrum for the next generation of wireless networks [6], [7].

Although FD has the capability of enhancing spectral efficiency, simultaneous downlink and uplink operations on the same band generate additional interference, which is likely to erode the performance gain of FD cells [8], [9]. In this work we focus on a mixed multi-cell system, where only some of the base stations (BSs) operate in FD mode, while the remaining BSs are in half duplex (HD) mode [8]–[10]. Using a stochastic geometry-based model that we propose, we investigate the impact of FD cells on the performance of such mixed systems. In particular, we analyze the throughput vs. coverage trade-off of the mixed system as a function of the proportion of FD cells, and for various network parameters such as self-interference cancellation (SIC) levels, and transmit power levels at the BS and at the user equipment (UE).

Throughput and Coverage for a Mixed Full and Half Duplex Small Cell Network Sanjay Goyal *, Carlo Galiotto†, Nicola Marchetti†, and Shivendra Panwar*