



THANK YOU TO OUR SPONSORS!



WELCOME

On behalf of the University of Chicago and the UChicago Careers in Business: Financial Markets (UCIB: FM) program, we are pleased to welcome you to the 4th Annual UChicago Midwest Trading Competition! We are thrilled to have you as part of our largest competition to date. Thank you to OptionsCity Software, UCIB: FM students, the Chicago Innovation Exchange (CIE), and most importantly, our corporate sponsors for their leadership and support.

This trading competition is powered by **OptionsCity Freeway™**. We thank OptionsCity Software for the countless hours they have dedicated to making this event happen. You will have numerous opportunities to meet members of OptionsCity as well as our other sponsoring companies throughout the event. This year's sponsors include: **3Red, Belvedere Trading, BP, CBOE, Citadel, D.E. Shaw & Co., DRW, Eurex, Flow Traders, Group One Trading, IMC Financial Markets, KCG, Optiver, and Wolverine.**

We are delighted to have four platinum sponsors this year: Citadel, DRW, IMC Financial Markets and Optiver. Each platinum sponsor has planned a unique event to get to know competition participants. Starting Friday afternoon, participants will have the opportunity to attend Optiver's Trading Immersion, IMC Financial Markets' Networking Reception, and Citadel's Campus Connect event. Saturday night, the winning teams will be treated to dinner by DRW.

The trading competition will begin at 8:00am on Saturday, April 9th at the Chicago Innovation Exchange (CIE)—near the University of Chicago campus in Hyde Park —and will conclude with an awards ceremony that same evening. The focus of this event will be algorithmic trading, with cases covering the following themes – cross-listed shares, algorithmic sales and trading, and options market-making. Please read through the remainder of this packet to find the three trading cases, a tentative schedule of events, and additional event logistics. As a reminder, **each team must bring at least one laptop to the competition on Saturday.**

Each case requires preparation before competition day, and we recommend you prepare your algorithms well in advance. They will be due to OptionsCity Software on Friday, April 1. Separately, BP will conduct a Crude Oil Trading Simulation. **This simulation requires no preparation in advance of the competition and will be scored independently of the other three cases.**

Along with the educational value that this event cultivates, it also brings together like-minded students from across the country, provides a great networking platform for our sponsors, and showcases the robust financial markets industry in the city of Chicago. If you have any questions regarding the competition, contact Kim Picciola at kpicciola@uchicago.edu. We look forward to hosting you in April.

Good Luck!

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SCHEDULE OF EVENTS

Friday, April 8

2:00PM

Optiver Trading Immersion

Prudential Plaza – 130 East Randolph, Suite 1300



5:00PM

IMC Financial Markets Networking Reception

Willis Tower – 233 South Wacker Drive, Suite 4300



7:30PM

Citadel Campus Connect

Lucky Strike Lanes – 322 East Illinois Street



Transportation will be available from Optiver to IMC and from IMC to Lucky Strike Lanes. Participants are required to provide their own transportation to Optiver. Photo ID required for check-in. Business casual attire.

Saturday, April 9

7:30AM

Shuttle Bus Departure

W Chicago-City Center – 172 West Adams Street

8:00AM

Trading Competition Check-in

Chicago Innovation Exchange (CIE) – 1452 East 53rd Street

Breakfast and networking. Photo ID required for check-in. Formal business attire.

8:45AM

Careers in Trading Breakfast Panel

Belvedere Trading, Citadel, DRW, IMC Financial Markets, Optiver, OptionsCity

9:45AM

OptionsCity Software Presentation



10:15AM

Case 1: Cross-Listed Shares

11:00AM

Break

11:15AM

Case 2: Algorithmic Sales & Trading

12:00PM

Networking with Firms & Lunch sponsored by CBOE

1:30PM

Case 3: Options Market-Making

2:30PM

Break

2:45PM

BP Crude Oil Trading Simulation

4:00PM

Awards Ceremony

Drinks and hors d'oeuvres will be served.

Note: DRW will treat the winning teams to dinner Saturday evening. Please make appropriate travel arrangements. To claim prize money, participants must be present at awards ceremony.



***** All sessions are required for participants to be eligible for prize money *****

PARTICIPANTS

We are pleased to announce that around 100 students will participate in this year's competition. The following institutions will be represented:

- Amherst College
- Baruch College
- Carnegie Mellon University
- Cornell University
- Dartmouth College
- Harvard University
- Indiana University
- Massachusetts Institute of Technology
- New York University
- Rice University
- St. Lawrence University
- University of Chicago
- University of California – Davis
- University of Colorado – Boulder
- University of Illinois – Urbana-Champaign
- University of Pennsylvania
- University of Southern California
- Washington University – St. Louis

AWARDS

Awards will be announced during the awards presentation and reception. Cash prizes will be awarded to the winning team of each individual case and the top three overall winners based on a weighted-average score. Participants must attend all sessions on Friday and Saturday to be eligible for prize money. **In addition to cash prizes, DRW will treat the winning team(s) to dinner Saturday evening after the awards ceremony.** Please be sure to make arrangements to be in Chicago through Saturday night to enjoy the city and potentially have the opportunity as a winning team to attend an exclusive dinner with DRW.

ATTIRE

Business casual attire is requested for Friday's events at Optiver, IMC Financial Markets and Citadel. Business formal attire is expected for the competition on Saturday. Jeans, gym shoes, tee shirts, or casual clothing are not permitted for any events. Thank you!

LOGISTICS

Friday, April 8

Optiver

Prudential Plaza – 130 East Randolph, Suite 1300

IMC Financial Markets

Willis Tower – 233 South Wacker Drive, Suite 4300

Citadel

Lucky Strike Lanes – 322 East Illinois Street

Optiver is a 20 minute walk from the W Chicago-City Center. A shuttle bus will be provided from Optiver to IMC and from IMC to Lucky Strike Lanes. Photo ID required for check-in. Business casual attire.

Saturday, April 9

Chicago Innovation Exchange (CIE)

1452 East 53rd Street

The CIE is near the UChicago main campus in Hyde Park (approximately 20 minutes from downtown Chicago). The entrance is located on 53rd street just west of the Five Guys restaurant. Enter through the double doors and head up to the 2nd floor. Photo ID required. Business formal attire. Participants are on their own for transportation after the competition.

Parking

The following parking options are available at the CIE:

- **Harper Court Garage**, located between 52nd and 53rd on South Lake Park Avenue. The garage entrance is on the west side of Lake Park Avenue, north of 53rd Street and is now accessible to both northbound and southbound traffic.
- **Hyatt Place Chicago-South Garage**, located at 5225 S. Harper Ave. This is a valet only underground garage for \$35 a day.
- **Hyatt General Public Lot**, immediately west of the Hyatt Hotel.
- **Street Parking**, There is limited free street parking northwest of the CIE.

Hotel

A block of rooms has been reserved at the W Chicago-City Center, 172 West Adams Street, Chicago, IL 60603. Participants are encouraged to stay both Friday and Saturday night.

Please click on the following link to make a reservation by March 18th:

[The W – UChicago Midwest Trading Competition Room Block](#)

Airport Information

Transportation to and from the airport will not be provided. Taxi and Ubers are available at both Midway and O'Hare airports. Alternatively, the Orange line serves the downtown Chicago area from Midway Airport and participants can take the Blue line directly into and out of the loop if preferred.

Questions regarding logistics should be sent to Elena Danos – edanos@uchicago.edu

OPTIONSCITY FREEWAY™ SYSTEM REQUIREMENTS

- Java 7 Runtime (Cannot be Java 6)
- 1-2 GB Ram
- Modern CPU (e.g., Pentium 4+)
- 1 GB Hard Drive Space
- Wireless Network Card
- Internet Connectivity
- Modern Graphics Card

Bitbucket Repository

In order for your team to collaborate and store your source code, a Bitbucket repository has been set-up. Everyone will receive an email from Bitbucket informing them that the repository has been shared with them and that they should make a new account. You will use this account to access the repository. For those of you who already have accounts with Bitbucket, you should see a new repository in your list of repositories.

In this repository you will find a skeleton for your source code as well as a Wiki. The Wiki describes all of the finer details of how you need to write your case code and what you will have to do. Please read through the wiki first, post any questions about it to the forum or send an email to project.uofc@optionscity.com.

Technical & General Support

For technical and development questions or support, each team will have access to a forum at forum.optionscity.com. Each contestant will receive an email from OptionsCity Software with their login and password. If you have questions that concern your team's implementation and need to remain private, you may direct questions to project.uofc@optioncity.com.

Please check the forum on a regular basis. Many of your questions may already be answered on the forum.

CASE 1: CROSS-LISTED SHARES TRADING

Introduction

Two companies, Napchat and Youber, are both listed on Exchange A and Exchange B. A and B shares have the same dividend claim, voting rights, etc. but there is a lead-lag relationship between share prices on the two exchanges. Your task in this case is to explore the lead-lag relationship, and profit from trading the four available securities: Napchat_A (NAPA), Napchat_B (NAPB), Youber_A (YBERA), and Youber_B (YBERB).

Trading Rules

1. A and B shares are not fungible; more specifically, if you long NAPA and short NAPB at the same time, you are trading two different securities, instead of conducting any arbitrage.
2. Short-selling is allowed on Exchange B, but prevented on Exchange A. If you try to short shares on Exchange A, the order will be rejected.
 - a. For instance, say you are long 100 shares of NAPA and you submit a sell order for 300 shares of NAPA, the entire order will be rejected, and you will still be long 100 shares of NAPA.
3. The following rules apply to both exchanges:
 - a. Maximum size for a single order is 1,000 shares. If you submit an order with size larger than 1,000, the entire order will be rejected
 - b. Maximum position for each security is $\pm 10,000$ shares.
 - c. If your maximum position is exceeded, a penalty of \$20 will be charged for each share outside of the limit every tick.

Round Specifications

Round 1

NAPA, NAPB, YBERA, YBERB are all tradable, with no further restrictions other than those set above.

NAP and YBER shares are uncorrelated.

Round 2

YBERA is not tradable, i.e. you will only be dealing with NAPA, NAPB and YBERB in this round. NAP and YBER shares are subject to a certain covariance matrix. (Of course, you can trade only NAPA and NAPB, but exploiting the covariance between NAP and YBER will significantly boost your potential profit.)

Round 3

All four securities are initially tradable. A new regulation is announced at the beginning of Round 3 that whenever an A stock moves up or down 7%, the security will be non-tradable in the next 100 ticks. Everything will be tradable at the last 10 ticks of the round so that you will be able to close out all your positions before end of round.

NAP and YBER are subject to the same covariance matrix as in Round 2.

Case Specifications (Risk Parameters, Limits, Penalties)

The case will run for three rounds each with 600 ticks. Trading will occur in discrete time, with 1 second being the tick. Each team will have an endowment of \$1,000,000 at the beginning of each round. Positions and PnL are not carried over between rounds. Teams will have time between rounds to make changes to their algorithm parameters if they choose.

At the end of every round your open positions will be liquidated at a loss. Long positions will be sold at 50% of the closing market price. Short positions will be bought at 150% of the closing market price. In addition to that loss, a penalty of \$20 will be charged per share for your entire position.

Scoring

Final scores will be calculated as PnL minus penalties.

Java Code

For this case you will be required to write a Java class that extends the AbstractCase1Job class. The Java class that you write should be named <TEAM NAME>Case1Job where <TEAM NAME> is the team name provided to you in all caps. The only requirement of your case 1 class is that it implements the following function.

```
public void onTick();
```

This method is called every tick and will be where you are allowed to make orders. To place an order from your `onTick()` implementation you can call this method:

```
public void order(Instrument instrument, int quantity);
```

This will place an order on the given instrument for the given quantity. A negative quantity represents a sell order and a positive quantity represents a buy order. Placing multiple orders on the same instrument during the same `onTick()` method will cause them to be combined into a single order. For instance if you place a buy order for 500 shares on an instrument and then a sell order for 150 shares they will be combined into a single buy order for 350 shares.

The only Instruments that you can trade in case 1 are the ones in the following enum:

```
public enum Case1Ticker implements Instrument {  
    NAPA, NAPB, YBERA, YBERB  
}
```

For information on the other methods and classes available in case 1 please see the wiki in your source code repository.

CASE 2: ALGORITHMIC SALES AND TRADING

Introduction

You are on a Sales and Trading Desk, where you will be receiving messages from your clients offering to buy and sell large amounts of stock. Because your clients do not want to deal with buying and selling these large quantities of stock themselves, they will be paying you commissions to buy and sell the stock for them. Your job is to make the most money possible off of these large incoming orders from your clients.

In particular, you will be writing a trading algorithm that (1) decides which incoming large orders from your clients to accept and (2) decides when to buy and sell assets on an exchange. The primary challenges of this case are to identify profitable block orders, manage your market risk, and deal with low liquidity environments and adverse selection.

The following sections will describe the two ways to make trades: (1) buying and selling on a centralized exchange and (2) accepting incoming block orders off of the exchange.

On the Exchange: Securities, Price Dynamics, and Fees

On the exchange, there will be five tradeable assets: one index (UCX) and four stocks. The price of each of the five assets will be generated following a discrete geometric Brownian motion. The returns of the stocks will be correlated to the returns of the index according to their respective betas.

Asset	Start Price	Beta	Volatility per Tick
Index (UCX)	100	1	0.1
Jewelry and Luxury Goods (JLG)	80	1.5	0.2
Mortgage Lender (ML)	60	2	0.3
Oil Company (OIL)	55	0.9	0.15
Water Company (WTR)	90	0.2	0.05

Any trades on the exchange will be executed at the prevailing market price on the tick. However, the trader will incur a fee for taking liquidity. The fees are structured in such a way to (1) capture adverse market impact by punishing larger orders with higher fees and (2) include standard fees.

The fee per share on trading “x” stocks on the exchange in round “j” is equal to:

$$\text{fee per share}(x) = c_j(1.001)^x,$$

where c_j is a constant for each round:

Round	c_j
1	0.9
2	2.0
3	2.5

Unlike the stocks, the fee for trading the index on exchange will be a fixed 5 cents per share in every round.

Off the Exchange: Block Order Dynamics and Commissions

In addition to being able to trade on the exchange, each team will receive requests from clients to trade large quantities of stock. We call these block orders. It is in your best interest to pay attention to block orders, as these clients may offer to buy and sell at very attractive prices. No block orders will come in for the index (UCX).

There are two types of block orders that you will receive:

- Private
 - You get an order offering to buy/sell a certain quantity at some price.
 - You will be given a fixed number of ticks to accept a private block order (as outlined in the “Case Specifications” section).
 - Example: Counterparty A wants to sell 8000 shares of WTR for \$90 per share. Do you want to accept or decline?
- Competitive
 - You get an order offering to buy/sell a certain quantity. However, you have to make an offer. If the offer exceeds an invisible threshold, you get the order.
 - You will be given a fixed number of ticks to attempt to match or beat the price of a competitive block order (as outlined in the “Case Specifications” section).
 - Example: Counterparty A wants to sell 8000 shares of WTR. What is your offer?

Accepting a private block order or matching a competitive one will award you with a 50 cents commission per share traded. No fees will be charged for block orders. The offers of the block orders will be between 1000-8000 shares. The frequency of incoming orders and the time you will have to accept the order will vary based on the round (see the table below). If you accept the block order, subsequently causing you to break your position limit, then you will only be partially filled. Carefully deciding which orders to accept and decline will be instrumental to doing well in this case.

Round	Time until Block Order Expires	Frequency of Incoming Block Orders
1	10 ticks	every 15-20 ticks
2	40 ticks	every 3-5 ticks
3	10 ticks	every 15-20 ticks

Counterparty ID

Throughout the case, you will be receiving private and competitive block orders from three counterparties: A, B, and C. One of these counterparties is a bank with many informed clients. Two of

the counterparties are pension funds who conduct no research. The identity of the counterparties will remain consistent throughout the rounds.

Case Specifications (Risk Parameters, Limits, Penalties)

The case will run for three rounds each with 600 ticks. Trading will occur in discrete time, with 1 second being the tick. You will start with \$2,000,000 dollars of wealth. You will have gross position limits on each asset of $\pm 20,000$ contracts (i.e you can both long and short). The maximum order size you can buy or sell on the exchange per tick is 1,000 shares per asset. Commissions and fees will be added/deducted to/from your wealth when incurred.

At the end of every round your assets will be liquidated at a loss of 50% of the closing market price. Long positions will be sold at 50% of the closing market price. Short positions will be bought at 150% of the closing market price.

Scoring

Rank within each round will be based on final wealth. Ties will be rounded up (that is, if team 1, team 2, and team 3 finish with wealth \$100, \$100, and \$90, then they will be assigned rank 1, 1, and 3, respectively).

Rank for the entire event will be the average of ranks in the three rounds.

Java Code

For this case you will be required to write a Java class that extends the **AbstractCase2Job** class. The Java class that you write should be named <TEAM NAME>**Case2Job** where <TEAM NAME> is the team name provided to you in all caps. Case 2 requires that you implement the 3 following functions:

```
public boolean onPrivateOrder(Case2Ticker, CounterParty, int, double);  
public double onCompetitiveOrder(Case2Ticker, CounterParty, int);  
public void onTick();
```

The **onPrivateOrder()** method is called every tick for every private block order that you have not yet accepted. The arguments passed into the function are, respectively; the instrument for which the order is being made, the counterparty making the order, the quantity of the order, and the price of the order. If you wish to trade this block order your implementation of this method should return **true** otherwise it should return **false**.

The **onCompetitiveOrder()** method is called every tick for every competitive block order that you have not yet met the price requirement for. The arguments passed into the function are, respectively; the instrument for which the order is being made, the counterparty making the order, and the quantity of the order. If you wish to attempt to trade this block order your implementation of this method should return a double representing the price at which you would like to trade, otherwise return any negative value.

It should be noted that the quantity in both of the block order methods is the quantity that the counterparty desires. That is to say if you accept a private block order and the quantity was 50, you will SELL 50 shares of that instrument.

The `onTick()` method is called every tick and will be where you are allowed to make orders.

To place an order from your `onTick()` implementation you can call this method:

```
public void order(Instrument instrument, int quantity);
```

This will place an order on the given instrument for the given quantity. A negative quantity represents a sell order and a positive quantity represents a buy order. Placing multiple orders on the same instrument during the same `onTick()` method will cause them to be combined into a single order. For instance if you place a buy order for 500 shares on an instrument and then a sell order for 150 shares they will be combined into a single buy order for 350 shares.

The only Instruments that you can trade in case 2 are the ones in the following enum:

```
public enum Case2Ticker implements Instrument {  
    UCX, JLG, ML, OIL, WTR  
}
```

Counterparties for the case are represented by the following enum:

```
public enum CounterParty {  
    A, B, C  
}
```

For information on the other methods and classes available in case 2 please see the wiki in your source code repository.

CASE 3: OPTIONS MARKET-MAKING

Introduction

This case is designed to capture the challenges of acting as a market-maker on an options exchange. Throughout changing market conditions, each team will maintain markets on multiple options for a single underlying index (UCHIX). The goal of this case will be to trade profitably within Delta and Vega risk parameters.

Each team will act as the sole market-maker on their exchange, and will make markets on 3 call options and 3 put options of the strikes 80, 100, and 120. At all times, you will be required to submit markets of quantity one for all 6 options. We will use a Black-Scholes model to generate the theoretical option prices, deltas, and vegas for you, which you will take as given. The options will be priced on 25% annual volatility with 6 months until expiry.

Market-Making

There will be three rounds of trading, each 600 ticks long. At the beginning of each round, the price of the underlying will begin at 100. Trading will occur in discrete time, with 1 second being the tick. At every second, you will provide a market for each of the 6 options. Every second, a broker will also bring an order to the exchange. Each order will be defined by 4 characteristics: buy or sell, call or put, price, and strike. If the broker's order crosses yours, then you will trade that 1 option. All teams will receive the same broker orders – your markets will determine whether or not you take the trades.

Note that you may choose to make your market as wide as you desire. If you are hit or lifted, you will always be filled at your market price. For example, if your market is \$9 @ \$10, and a broker submits a sell offer at \$6, you will buy the option for \$9. Just as in the real market, you will not be able to see what the highest price the client was originally willing to pay. Thus, you should be careful to not make your markets too narrow or too wide.

Case Specifications (Risk Parameters, Limits, Penalties)

As a market-maker, your goal will be to trade profitably while taking little market risk. Thus, you will have a Delta limit of $\pm 1,000$ and a Vega limit of ± 500 . Note that in-the-money options have the most Delta, while at-the-money options have the most Vega. One share of the underlying index will have a Delta of 100. You may trade the underlying at any time, but only if the absolute value of your Delta after the trade would be less than or equal to the absolute value of your Delta before the trade. For example, if your position delta is 700, you can sell, but not buy call options as this will reduce your position delta; you can buy, but not sell put options as this will reduce your position delta. However, you cannot sell so many call options as to reduce your delta position to less than -700.

When your Delta limit is exceeded, you will have 10 seconds to hedge until you are penalized. After 10 ticks, your risk control department will automatically buy or sell shares of the underlying until you are within ± 700 Delta. You will be forced to buy at 110% of the underlying price or sell at 90% the underlying price, resulting in negative PNL impact.

When your Vega limit is exceeded, you will have 20 seconds to hedge until you are penalized. Note that you have more time here since you can only hedge Vega by waiting for broker orders. After 20 seconds, your risk control department will sell at-the-money straddles (calls and puts) until you are within ± 350 Vega. The straddle line (80, 100, or 120) depends on where the underlying is currently trading. As

options are generally less liquid than the underlying, you will either buy straddles for 125% of the market price, or sell straddles for 75% of the market price, resulting in negative PNL impact.

In the rare case in which both Delta and Vega are forcibly hedged on the same tick, Vega will be hedged first in case it changes your Delta position. Please note that this could result in more delta-hedging than you would expect in this situation.

Scoring

Scoring will be based solely on PNL, which will include profits and losses from both closed positions and the market value of open positions. Participants begin each round with no position.

Java Code

For this case you will be required to write a Java class that extends the **AbstractCase3Job** class. The Java class that you write should be named <TEAM NAME>Case3Job where <TEAM NAME> is the team name provided to you in all caps. Case 3 requires that you implement the 3 following functions:

```
public void onVegaLimitBreached();  
public void onDeltaLimitBreached();  
public void onTick();
```

The **onVegaLimitBreached()** method is called on every tick for which you have exceeded your vega limit.

The **onDeltaLimitBreached()** method is called on every tick for which you have exceeded your delta limit. You are permitted to make calls to the **order()** method to trade the **Case3Ticker.UCHIX** instrument from this method in order to reduce your absolute delta.

Neither of these methods are required to do anything in the bodies of their implementations but they must at least have an empty body in your Java class so that it will compile when uploaded.

The **onTick()** method is called every tick and will be where you are allowed to make orders.

To place an order from your **onTick()** implementation (as well as the implementation of your **onDeltaLimitBreached()** method) you can call this method:

```
public void order(Instrument instrument, int quantity);
```

This will place an order on the given instrument for the given quantity. A negative quantity represents a sell order and a positive quantity represents a buy order. Placing multiple orders on the same instrument during the same **onTick()** method will cause them to be combined into a single order. For instance if you place a buy order for 10 shares on an instrument and then a sell order for 3 shares they will be combined into a single buy order for 7 shares.

The only **Instrument** that you can trade in case 3 is the sole instance of the following enum:

```
public enum Case3Ticker implements Instrument {  
    UCHIX  
}
```

To make markets on options from within your `onTick()` implementation you can make calls to this function:

```
public void MakeMarket(Case3Option, Market);
```

This function will then set your bid-ask market for the given option to be the given market (recall that the quantity on each side will always be 1, by default). If during any tick you do not make a call to this function for an option your market will be left at the most recently assigned value for that option. At the beginning of each round your markets will be set as wide as possible (having a bid value of 0.0 and an offer value of `Double.MAX_VALUE`).

An option in case 3 is represented by the follow enum:

```
public enum Case3Option implements Instrument {  
    CALL_80, CALL_100, CALL_120, PUT_80, PUT_100, PUT_120  
}
```

A market in case 3 is represented by an instance of the following class:

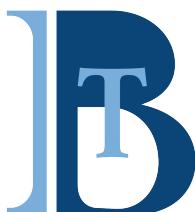
```
public class Market {  
    public double bid;  
    public double ask;  
}
```

For information on the other methods and classes available in case 3 please see the wiki in your source code repository.



3Red is a **prop trading start-up** with offices in **Chicago and New York**. We leverage **technology and math** to implement competitive trading strategies while managing risk and responding to dynamic market conditions.

What sets us apart from other businesses is that **adding value is based on the work you do** and not your ability to climb the corporate political ladder. **We have no products, clients, or customers.** Everyone is here because they love the work, those they work with, and have a passion for markets. Our people are hired for their talents and are recognized for their individual contributions that are building a trading company.



BELVEDERE TRADING

Founded in 2002, Belvedere Trading is a leading proprietary trading firm that specializes in equity index and commodity derivatives. Belvedere Trading's employees act as market makers, ensuring liquidity by laying two-sided markets to help provide an orderly market place for the products we trade. We trade electronically from our headquarters in downtown Chicago and have traders on the floors of multiple exchanges. Our technology and trading experts collaborate to develop and continually enhance Belvedere's high-performance, low-latency proprietary technology. Belvedere is always looking for the best, brightest, and most motivated talent to help us in our continued success.

Our employees are competitive and entrepreneurial individuals who demonstrate a passion for learning and development across multiple trading and technology disciplines. Intellectual curiosity drives Team Belvedere to think strategically in creating the business solutions that help the firm achieve optimal results. We believe that great ideas can come from anywhere and anyone so we encourage all of our employees to take a passionate interest in promoting, within the team environment, those solutions they feel strongly about. Through this open exchange of ideas, experienced and novice team members alike grow professionally.



BP is a leader in the Global Energy Trading Market. We trade a varied range of products including oil, natural gas, liquefied natural gas, currencies, metals and financials derivatives.

Experience realism and pressure of a world-class trading organization by participating in our trading simulation for prizes.

- Manage your positions and determine your trading strategy
- Compete in a fast-paced real-time market against your peers
- Use state of the art technology

Come join us and learn how BP positions itself in the commodities trading space and where we extract value for our business. The game will bring to life some of the decisions we face every day.

Learn. Trade. Win.



CBOE, the largest U.S. options exchange and creator of listed options, continues to set the bar for options and volatility trading through product innovation, trading technology and investor education. CBOE Holdings offers equity, index and ETP options, including proprietary products, such as S&P 500 options (SPX), the most active U.S. index option, and options and futures on the CBOE Volatility Index (the VIX Index). Other products engineered by CBOE include equity options, security index options, Weeklys options, LEAPS options, FLEX options, and benchmark products such as the CBOE S&P BuyWrite Index (BXM). CBOE Holdings is home to the world-renowned Options Institute, Livevol options analytics and data tools, and www.cboe.com, the go-to place for options and volatility trading resources. CBOE Holdings, Inc. (NASDAQ: CBOE) is the holding company for Chicago Board Options Exchange (CBOE), the CBOE Futures Exchange (CFE), and other subsidiaries.



Citadel is a worldwide leader in finance that uses next-generation technology and alpha-driven strategies to transform the global economy. We tackle some of the toughest problems in the industry by pushing ourselves to be the best again and again. It's demanding work for the brightest minds, but we wouldn't have it any other way. Here, great ideas come from everyone.



Headquartered in New York City, the D. E. Shaw group is a global investment and technology development firm with offices in North America, Europe, and Asia. Since its organization in 1988 by a former Columbia University computer science professor, David E. Shaw, the firm has earned an international reputation for successful investing based on financial innovation, careful risk management, and the quality and depth of our staff. Our investment activities are based on both mathematical models and our staff's expertise, and our multi-disciplinary approach combines insights from quantitative fields, software development, sector expertise, and finance. We offer the benefits of being one of the world's largest, most established alternative investment managers, with a world-class technology infrastructure, deep research capabilities, and programs that facilitate the ongoing growth and internal mobility of staff. We have a long history of looking for candidates who aren't conventional "financial types," and our culture doesn't fit the typical corporate mold.



At DRW, we identify and capture trading and investment opportunities globally. What sets us apart is our diversified approach—trading across many asset classes and instruments, in markets around the world, with horizons from seconds to years. We succeed by bringing together sophisticated technology, in-depth research and careful risk management.

We offer the best of both worlds: the opportunity and spirit of a startup and the benefits and stability of an established, experienced firm. DRW runs as a true meritocracy, a place where ideas reign and results are rewarded. We believe that you should have passion for what you do and have fun while you're doing it, and we support the communities where we live and work.

Headquartered in Chicago, with offices in London, Montreal, New York, San Francisco and Singapore, we're always looking for exceptional people to join our team as traders, software engineers, researchers and many other positions.

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FLOW ■ TRADERS

Company

Founded in 2004, Flow Traders is a leading principal trading firm headquartered in Amsterdam and offices in New York, Singapore and Cluj accommodating over 250 employees. As a global technology-enabled liquidity provider specialized in Exchange Traded Products (ETPs), Flow Traders continuously provides liquidity to the major financial markets. Our sophisticated in-house technology platform enables us to quote prices on many exchanges simultaneously. We also quote bid and ask prices off-exchange to institutional counterparties on request. Robust risk management is at the core of our business, and our risk functions are closely integrated into our platform.

We Offer

Flow Traders grew to be as successful as we are today out of the expertise and experience of our founding partners. Our non-hierarchical approach stimulates innovation and achievement. We invest in our talented, highly motivated people since they hold the key to our success and like to think that talent grows at Flow and stays at Flow. To ensure this, we provide our employees with the best working environment, the latest technology, continuous support, and we go out of our way to retain the small business feeling with which we started. Our demanding, sophisticated work continuously puts us to the test. We wouldn't have it any other way. We. Love. This. Job. For more information about the exciting employment opportunities at Flow Traders, visit: www.flowtraders.com.

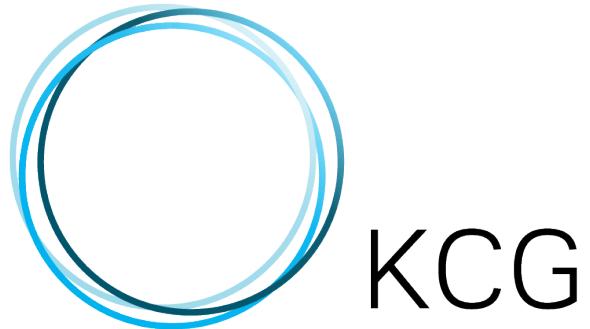


With over 25 years in business, Group One Trading, LP is one of the largest proprietary option trading firms in the country. Headquartered in Chicago, our traders make markets in over 3,200 listed equity and equity index options.

Armed with expertise developed through a rigorous training program, our traders provide competitive liquidity across a broad range of securities. We manage portfolios of several hundred issues, and simultaneously stream quotes across multiple exchanges. Our unique understanding of pricing and special situations, combined with real time risk management and superior technology allow us to stay a step ahead of the markets.



IMC Financial Markets is one of the world's leading proprietary trading firms and is driven by the best people and technology. We are a key market maker in various products listed on exchanges throughout the world. We trade financial instruments on exchanges around the world 24/7 and have built one of the fastest, most automated trading platforms on the globe to do so. We are a high frequency trading firm, but are just as much a technology company. IMC is on the frontier of algorithm development and finds new ways to make the electronic markets even more efficient by providing meaningful liquidity. High performance algorithms and smart strategies are the core of our business.



KCG is a market leader in U.S. equities, which is the most accessible, competitive, technologically advanced and liquid segment of the global securities market. In 2014, KCG market making accounted for approximately 12.7% of the consolidated U.S. equity share volume and was the clear market leader in over-the-counter (OTC) traded stocks. In addition, the firm is an active participant on futures, options, ETFs, fixed income, and foreign exchange and commodities markets.

The firm's complementary core offerings—market making, client execution services, and trading venues—give KCG a competitive advantage in developing and applying innovative tools that deliver efficiencies and performance across the organization. As trading continues to shift from analog to digital across all asset classes, we believe that KCG's opportunities will only broaden.

- Boutique-like, responsive service
- Better trading tools
- Greater agility and efficiency



OptionsCity Software powers the trading, risk management and analytics needs of futures and options traders, market makers, financial institutions and other market participants worldwide. OptionsCity is a certified Independent Software Vendor and a leading source of electronic options trading volume on global derivatives exchanges. For more information, please visit www.optionscity.com.



We are Optiver, an international trading company, headquartered in Amsterdam. With more than 800 colleagues across four continents we constantly offer fair and highly competitive prices for the buying and selling of stocks, bonds, options, futures, and ETF's. It is called 'market making'. We build markets and provide liquidity to international exchanges in Europe, the US, and Asia Pacific.

We make financial markets fair, open, and reliable. We do trade, only because we feel like it, or when our outlook is bright, but 24 hours a day. Whichever way the markets go, we are there, always at our own risk, using our own capital. 'Value the difference' sums it up perfectly. It explains in a nutshell what we do every day. It also invites you to explore how we do our job differently. We have valued that difference since 1986; the year we started on the Amsterdam based European Options Exchange with a single floor trader. Today we are one of the most dynamic, innovative and successful companies in the Netherlands and beyond.

For more information, visit: www.optiver.com.



Founded in 1994, the Wolverine companies comprise a number of diversified financial institutions specializing in proprietary trading, asset management, order execution services, and technology solutions. We are recognized as a market leader in derivatives valuation, trading, and value-added order execution across global equity, options, and futures markets. With a focus on innovation, achievement, and integrity, we take pride in serving the interests of both our clients and colleagues. The Wolverine companies are headquartered in Chicago with offices in New York and San Francisco and a proprietary trading affiliate office located in London.